

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE;

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2255.—VOL. XLVIII.

LONDON, SATURDAY, NOVEMBER 9, 1878.

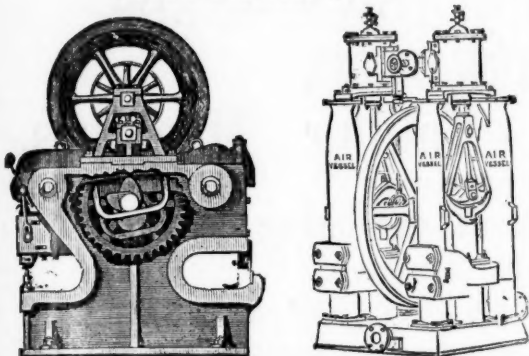
PRICE (WITH THE JOURNAL) SIXPENCE.
PER ANNUM, BY POST, £1 4s.

JOHN CAMERON'S

SPECIALITIES ARE ALL SIZES OF

Steam Pumps, Shipbuilders' Tools,
BAR SHEARS.

ESTABLISHED 1852.



OLDFIELD ROAD IRON WORKS,
SALFORD, MANCHESTER.

For Excellence
and Practical Success
of Engines



Represented by
Model exhibited by
this Firm.

HARVEY AND CO.

ENGINEERS AND GENERAL MERCHANTS,
HAYLE, CORNWALL,
LONDON OFFICE,—186, GRESHAM HOUSE, E.C.

MANUFACTURERS OF

PUMPING and other LAND ENGINES and MARINE STEAM ENGINES
of the largest and most approved kinds in use, SUGAR MACHINERY,
MILLWORK, MINING MACHINERY, AND MACHINERY IN GENERAL.
SHIPBUILDERS IN WOOD AND IRON.

MANUFACTURERS OF

HUSBAND'S PATENT PNEUMATIC STAMPS.

SECONDHAND MINING MACHINERY FOR SALE,
In Good Condition, at Moderate Prices—viz.,

PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES;
STEAM CAPSTANS; ORE CRUSHERS; BOILERS and PITWORK of
various sizes and descriptions; and all kinds of MATERIALS required for
MINING PURPOSES.

THE

PHOSPHOR BRONZE
COMPANY (LIMITED).

139, CANNON STREET, E.C.
LONDON.



Alloy, No. II., for pinions, ornamental castings, steam
fittings, &c. 110s. per cwt.
" No. IV., for pinions, pumps, valves, linings,
cylinders, &c. 110s. "
" No. VI. (must be cast in chill) for bolts, &c.
This alloy has very great tensile strength ... 125s. "
" No. VII., for hydraulic pumps, valves, and
plungers, piston rings, bushes and bearings,
for steel shafts ... 125s. "
" No. XI., special phosphor-bronze bearing metal,
wearing five times as long as gun metal ... 105s. "
Prices of castings vary according to the pattern, the quantity required, and
the alloy used.

WIRE ROPES, TUBES OF ALL DESCRIPTIONS, &c.

STANDARD LUBRICATING OILS
COMPANY, LIMITED.

BLACK and PALE OILS for MACHINERY, RAILWAY, and MINING
PURPOSES, from TWO SHILLINGS per gallon, and upwards.
AGENTS WANTED.

1, DRAPERS' GARDENS, THROMMORTON AVENUE,
LONDON, E.C.

ALEX. CHAPLIN AND CO.,

STONHILL ENGINE WORKS, GLASGOW.

PATENTERS AND SOLE MANUFACTURERS OF

CHAPLINS' PATENT STEAM CRANES, HOISTS,
LOCOMOTIVES, AND OTHER ENGINES AND BOILERS.

LONDON HOUSE:—

McKENDRICK, BALL, AND CO.,

No. 63, QUEEN VICTORIA STREET, LONDON, E.C.



PARIS,
BRONZE MEDAL, 1875.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,
SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-
nel, the McKean Rock Drill continued to work until the pres-
sure was reduced to one-half atmosphere (7½ lbs.), showing
almost the entire motive force to be available for the blow
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
NORTH-WESTERN RAILWAY for the FESTINIOG TUN-
NEL; and the BRITISH GOVERNMENT for several Public
Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
cost. The ratio of advantage over hand labour is greatest
where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
USE THROUGHOUT THE WORLD FOR MINING, TUN-
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operat-
ing parts—work with a lower pressure than any other Rock
Drill—may be worked at a higher pressure than any other
—may be run with safety to FIFTEEN HUNDRED STROKES
PER MINUTE—do not require a mechanic to work them—are
the smallest, shortest, and lightest of all machines—will give
the longest feed without change of tool—work with long or
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or
open work. Their working parts are best protected against
grit and accidents. The various methods of mounting them
are the most efficient.

N.B.—Correspondents should state particulars as to
character of work in hand in writing us for information,
on receipt of which a special definite answer, with
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

MCKEAN AND CO.

ENGINEERS.

OFFICES,

5, RUE SCRIBE, PARIS

MANUFACTURED FOR MCKEAN AND CO. BY

Messrs. P. AND W. MACLELLAN, "CLUTHA IRONWORKS,"
GLASGOW.

SMITH & FORREST,
OIL REFINERS,
ROSIN OIL DISTILLERS,
GREASE AND VARNISH MANUFACTURERS,
HOLT TOWN.
MANCHESTER.

Price List on application.

[ESTABLISHED TEN YEARS.]

THE
DARLINGTON WAGON COMPANY,
MANUFACTURERS OF
RAILWAY WAGONS
OF EVERY DESCRIPTION,

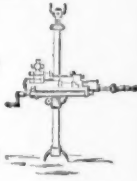
For Cash, or on Deferred Payments, or Hire.
REPAIRS EXECUTED WITH DESPATCH, ON REASONABLE TERMS.
OFFICES AND WORKS.

ALBERT HILL, DARLINGTON.

DUNN'S ROCK DRILL,
AND
AIR COMPRESSORS.



FOR DRIVING BED ROCK
TUNNELS, SINKING
SHAFTS, AND PERFORMING
OPEN FIELD OPERATIONS,
IS THE
CHEAPEST, SIMPLEST,
STRONGEST, & MOST EFFECTIVE
DRILL IN THE WORLD.



Dunn's Patent Rock Drill Company
(LIMITED).

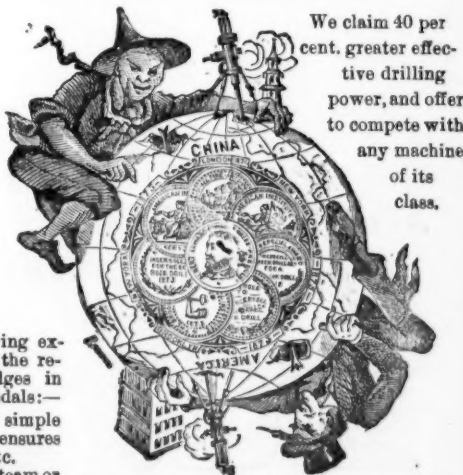
OFFICE,—193, GOSWELL ROAD
LONDON, E.C.

PATENT

"INGERSOLL ROCK DRILL,"
LE GROS, MAYNE, LEAVER, & CO

60, Queen Victoria Street, London, E.C.

5, PARK PLACE, NEW YORK, U.S.A.



We claim 40 per
cent. greater effective
drilling
power, and offer
to compete with
any machine
of its
class.

The following ex-
tracts from the re-
ports of Judges in
awarding Medals:—

"2. Its simple
construction ensures
durability, &c.

"4.—The steam or
air cushions at each end of cylinder effectually protect from injury

"5. Its having an automatic feed, giving it a steady motion, &c.

"6. Its greater steadiness and absence of jar and vibration ex-
perienced in other drills, which is very destructive to their working
parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the
Ingersoll."

Medals awarded for several years in succession "For the reason
that we adjudge it so important in its use and complete in its con-
struction as to supplant every article previously used for accom-
plishing the same purpose."

Estimates given for Air Compressors and all kinds of Mining
Machinery. Send for Illustrated Catalogues Price Lists, Testi-
monials, &c., as above.

PUMPING MACHINERY.

A GOLD AND SILVER MEDAL

HAS BEEN AWARDED TO

HAYWARD TYLER & CO.,

LONDON,

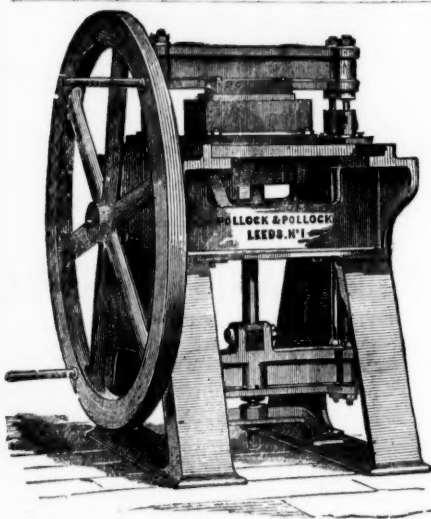
FOR THEIR EXHIBIT OF MACHINERY AT THE

PARIS EXHIBITION, 1878.

Sole Makers of the Hot-Air Engine, to be seen working at No. 39, Queen Victoria Street.

FUEL costs only 2s. 6d. a week for $\frac{1}{2}$ -H.P.

HAYWARD TYLER AND CO., Whitecross-street, London.



POLLOCK AND POLLOCK,

LONGCLOSE WORKS, NEW TOWN, LEEDS,

POLLOCK'S PATENT BRICK PRESS,

The New "XL" Brick-Making Machines,

THE CHEAPEST AND BEST IN THE MARKET.

Improved Grinding Pans, with patent self-acting delivery.
Vertical and Horizontal Engines.

COLLIERY ENGINEERS.—WINDING ENGINES OF ALL SIZES.

POLLOCK AND MITCHELL'S PATENT KILNS are the Cheapest and Simplest.

London Office —155, Fenchurch Street, E.C.

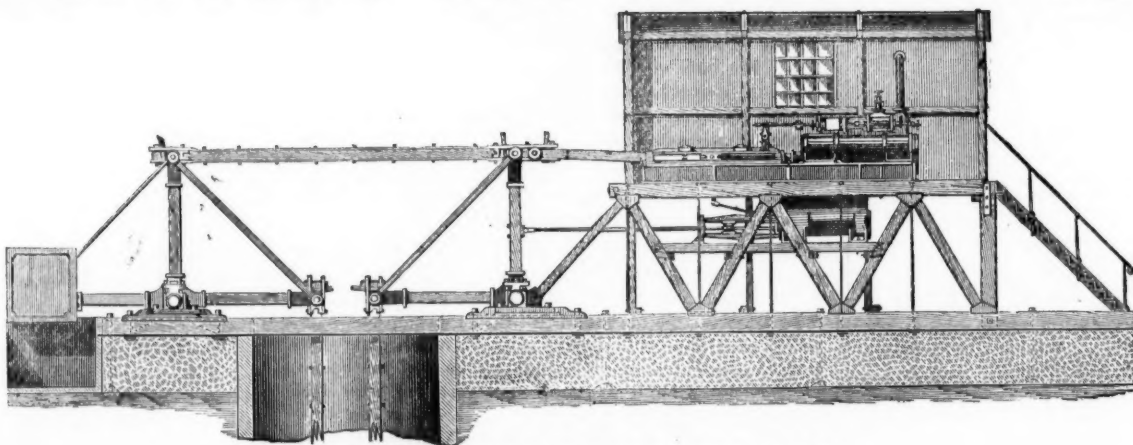
GOLD MEDAL FOR PUMPING MACHINERY—PARIS EXHIBITION, 1878.

PORTABLE PUMPING ENGINES

FOR TEMPORARY AND SINKING PURPOSES.

Compound
Differential
Pumping
Engines.

Air Compressing
Engines.



CATALOGUES ON APPLICATION

Hydraulic
Engines and
Mining Plant
of all kinds.

HATHORN, DAVY, & CO., LEEDS.

JOHN BEATSON AND SON,

IRONGATE, DERBY.



IRON AND STEEL RAILS, of all sections; from 10 to 82 lbs. per yard, new, defective, or second-hand.

POINTS AND CROSSINGS, FISH PLATES, BOLTS, NUTS, CHAIRS, AND SPIKES.

DERBYSHIRE, YORKSHIRE, HEMATITE, SCOTCH, AND COLD-BLAST FIG-IRON.

STEEL AND MALLEABLE IRON, of all qualities and sections.
Delivered at all Ports and Railway Stations in Great Britain.

THE NEWCASTLE DAILY CHRONICLE
(ESTABLISHED 1764.)
THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISER
Offices, Westgate-road, Newcastle-upon-Tyne; 60, Howard street, North Shields; 195 High street, Sunderland.

STEVENS' PATENT UNDERGROUND WINDING ENGINE,

DESIGNED FOR USING COMPRESSED AIR OR STEAM,

SIMPLE, COMPACT, PORTABLE.

Silver Medal, Royal Cornwall Polytechnic Society, 1876.

No. 1 size, 7 in. single cylinder, with 2 ft. drums.
No. 2 size, 9 in. single cylinder, with 2 ft. 6 in. drums.

Larger sizes made with two cylinders.

A,— 6 in. double cylinder, with 2 ft. 3 in. drums.
B,— 8 in. " " 3 ft. 0 in. drums.
C,— 10 in. " " 3 ft. 6 in. drums.
D,— 12 in. " " 4 ft. 6 in. drums.

MANUFACTURED BY

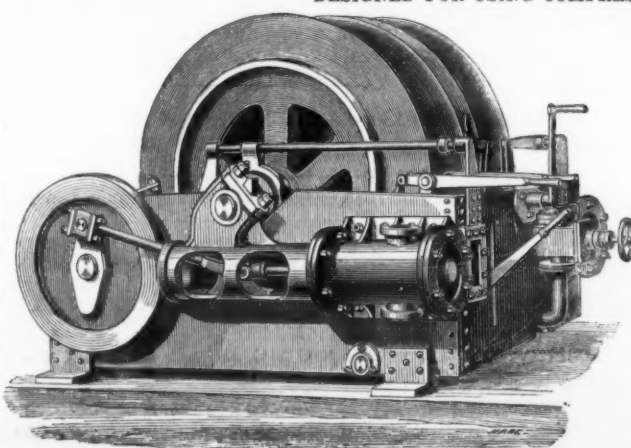
THE USKSID CO.,

ENGINEERS, MAKERS OF PUMPING AND WINDING
MACHINERY, AND FORGINGS OF EVERY
DESCRIPTION,

NEWPORT, MON

Agents for the six Northern Counties—
TANGYE BROTHERS, ST. NICHOLAS BUILDING
NEWCASTLE-ON-TYNE.

[This Advertisement appears fortnightly.]



Original Correspondence.

TIN MINING IN LARUT—No. III.

BY P. DOYLE, C.E., F.S.S., M.R.A.S.

(Formerly of the Kurruballee Collieries, East Indian Railway, Bengal.)

Water is the great agent in the mining operations in Larut. Without water, or with only a limited amount, a claim that would have been otherwise highly productive may either become valueless or only capable of affording very irregular returns. It would be impossible to cleanse the tin ore (sand) from the different earthy materials with which it is associated, or to turn the clumsy water-wheels by which the pits are drained, without this essential requisite, and it is the chief and a very fertile cause of dispute among the miners. Its want was at one time considered such a great difficulty in the working of the mines that the apprehensions of Government were carried into the form of a proposal for the construction of reservoirs for a supply to meet certain contingencies at a cost of 25,000. It was fortunate for the country that no funds were available for carrying the scheme into execution, and the project has now been consigned to the limbo of a good many official ideas of interest and importance—all alike more or less purporting to benefit the community and remunerate the State. The mining area has since the idea was first entertained, in 1874, increased largely, and is still increasing—the output also increasing, as will be seen subsequently, in a much more favourable proportion. The difficulties regarding water supply arise more from waste and indiscriminate working than actual want, and, all things considered, the only remedy available—consistent with a non-interference with experience with existing rights and the extension of the workings—is steam pumping machinery, to the advantages of which the present head of the administration (Mr. Low) is fully alive. The rainfall (already mentioned) is distributed throughout the year, which, coupled with the physical aspects of the country and its position within the zone of perpetual deposition, all place beyond the possibility of doubt that the anticipation of periods of long-continued drought were raised on very insufficient grounds.

When a sufficient quantity of tin dirt has been collected near the washing-place the operation—which corresponds with the Cornish buddling—commences. The appliances for this purpose in Larut are much the same as some of those once in use in the placer washings of Australia and California, but more particularly the Tom or Long Tom of the latter, which is a very close approach to the sluice-boxes universally employed in the Larut washings. These boxes are little else than a trough or gutter, formed of three planks, of from 20 to 30 ft. in length, having the channel from 2 to 3 ft. wide, and from 1 to 2 ft. deep, and placed at varying grades, dependent upon length, but the inclination never exceeding an angle of 10°. It is obvious, also, that the water supply available for washing should be an important consideration in regulating the cross section and fall of the channel, and the Chinese appear to be fully aware of the fact—the object being to obtain such a velocity that the water after disintegrating the dirt in flowing down will carry on with it the gravel and earth, leaving the heavier tin sand to sink in the trough behind riffles or cross slats, of which there are only two—one about 5 ft. from the upper end, and the other 2 ft. above the lower end. After a sufficient quantity of tin dirt is thrown into the gutter and a stream of water turned on three men travel in the box with canks or hoes, by which the puddle is kept constantly stirred, and one man is employed with a rake, removing the large stones, and throwing back against the current such portions of the wash-dirt which require further disintegration. Three men are necessary for clearing the tail of the small stones and sand which gradually accumulate at the bottom, while a fresh supply of tin-dirt is shovelled in at the head of the trough. The Chinese, as a rule, always work with a heavy stream of water, and, no fork being used as in Australia and California, the stuff is either carried through before it is sufficiently washed, or the force of the water carries off much of the finer particles of tin sand, which are thus practically lost to the undertaking. Great improvements might be made here with a view to prevent at least a part of the loss which attends these operations. That this loss is high, and perhaps excessively so, is proved by the circumstance that in some of the workings a second washing is frequently considered necessary, and in others the more industrious of the miners find it worth their while to devote their leisure hours to the same purpose. The yield of tin sand varies from 1 to 2 per cent. of the tin dirt. The cost of washing is generally included with that of getting, and correct observation, coupled with careful enquiry, show that it requires generally 900 units of a miner's ordinary working day to produce 32 cubic feet of tin sand—the range being between 800 and 1000, and rate $\frac{1}{2}$ per unit. This will be reverted to in the statistics of labour and cost of production, to follow hereafter.

On the termination of the washing the ore, in the form of a black, heavy, fine-grained sand, is taken to the smelting-house.

It may not be out of place to mention that the Chinese miners believe the tin ore to be under the guardianship of demons, whom they anxiously endeavour to propitiate by offerings. Formerly they would not permit anyone to cross the ore streams, but now they are constrained to confine this prohibition to persons with shoes going down into the pit where the ore is lying.

The only known instance of an attempt being made to introduce the European methods of working in the extraction of tin ore in the Larut mines was that made by an Australian miner, Mr. Wm. Scott, from Melbourne (under the writer's superintendence), and the following results of one of the experimental adit levels driven into the face of one of the pits may possibly interest those connected with the tin industry elsewhere:—Section of working: height, 4 ft. 6 in.; width, 3 ft. 9 in.; length on the clear, 24 ft. (= 7 sets, 4 ft. from centre to centre). Timbering: 7 sets, each set including side, cap, and sole pieces, requiring 16 running feet of timber = 112 at 4 c. a foot = \$44.8 c., and 4 tap and 2 side laths between each set = 36, at 8 c. a lath = \$2.88 c.; labour in making and fixing, 2 carpenters for 10 days = 20, at 60 c. a day = \$12; total cost of timbering, labour, and materials, \$19.36 c., or 80 c. a foot driven. Getting: 3 men for 10 days = 30, at 40 c. a day = \$12; 5 men for 6 days = 30, at 30 c. a day = \$9; 8 coolies on occasions, at 25 c. = \$2; total cost of getting, including removing, 382.5 cubic feet of tin wash or dirt, \$21, or 87 c. a foot driven, otherwise 18 cubic feet a dollar, or averaging nearly 6 cubic feet per man per day. This result is unreliable, as a great deal of the labour was dissipated in baling. Washing: 1 overman, at 40 c. a day; 10 men, at 30 c. a day = \$3; total cost of washing, 382.5 cubic feet tin wash or dirt, \$3.40 c., or a little less than 1 c. a foot, otherwise nearly $\frac{1}{2}$ cubic foot per man per day. The quantity of tin dirt or wash extracted—382.5 cubic feet—yielded 4.58 cubic feet, or 1.2 per cent. of tin sand, weighing 571 catties, affording a specific gravity of 2.66, or a little over one-third of that of the white metal.

The causes which necessitated the abandonment of the working were—1, an obstruction, and, 2, frequent floodings—both of which would have entailed unnecessary expenditure by a continuance of the operations, the latter being a disadvantage (from the contiguity of a dump) which might have been avoided, but the former (fallen drift timber of a bygone period) is a contingency which might be expected in alluvial (tin) ground anywhere in Larut.

The undertaking was financially successful, for the 571 catties of tin sand, the output of the working, was sold (at 8 c. a catty) for \$45.68 c., and thereby covering the working expenses, which aggregated \$43.76 c., besides leaving a margin of more than 4 per cent. profit in less than a fortnight's operations. The further the working extended the proportionate cost would have decreased, lead-backed by recent experience in similar undertakings, better results must be a consequence more than possible, if not an absolute certainty.

In concluding the part of the subject relating to the extraction of the ore a few words may be added regarding a very good and, presence of this substance from among the many varieties of black sand with which it is likely to be compounded. It may not be generally known, and it will doubtless surprise many to learn, that

if a few grains of the crystals of tin ore be first crushed with a hammer, and afterwards ground down in a glass or agate mortar, the resulting fine powder will be of a fine pink colour. Foreign adventurers prospecting for tin invariably apply this method, which is stated to answer well—in fact, they carry a sort of diamond mortar, expressly constructed to facilitate its application. Iron sand will be found to be irreducible under the pestle, and will not change its black colour.

The spring level of the country may be taken at a depth of 6 ft. below the surface of the ground, and, accordingly, when the excavations have reached about this depth, and water is struck, it is then only that the miners' difficulties may be said to have commenced. The percolation of water into the workings from the comparatively porous soils which overlie the ore stratum is very great indeed, which is in a great measure due to the numerous water-courses intersecting the workings, as well as the high rainfall and other causes.

The mines being entirely quarries or open excavations, the effects of a tropical downpour may be easily imagined. The abandoned or disused mines also become so many pools or, as it were, reserves, from which water oozes into the neighbouring workings. There is one continued struggle between the miner and this element for supremacy, in which the Chinese rises superior to the difficulty by bringing his proverbial ingenuity to the rescue—the result being the Chin Chia or chain-pump, where the element is turned against itself, and water utilised to overcome water.

The reader will now commence to understand that the "want of water" as applied to the Larut mines has only a local signification—implying a deficit in the streams which proceed from the higher grounds into the mining area, and are there used for turning the water-wheels, which work the pumps engaged in draining. The subject has been adverted to before, but its importance will be the only excuse for reiterating that steam-pumps are indispensably necessary for the development of the tin industry in Larut, and it would amply repay any investment made in this direction.

The chain-pump in use by the Chinese in the Larut mines is only a modification of appliances long known in Europe and the East.* It consists of a wooden gutter or working barrel, placed at an angle which seldom exceeds 20°. A fair average of the existing grades is 1 in 6. The gutter or trough is from 12 to 16 in. high, and from 4 to 6 in. wide, and of lengths ranging up to 100 ft., composed of three single planks. A few inches above, and supported by framing attached to the sides, a fourth plank or platform runs for the full length parallel to the trough. An endless wooden chain, with wooden blades, about 1 foot apart, on each side of the link, is exactly fitted to and works in the wooden channels, passing over two pulleys, one at the upper and one at the lower end. The upper pulley is on the axle of an overhead water-wheel, driven from the tail race of the mine higher up, or directly from the head race, and the pulley at the lower end of the pump, which is submerged, guides the blades which travel down the platform and up the trough, the water drawn up by the floats being discharged into a channel at the head. In some of the smaller workings the pump is worked by coolies, by means of a treadmill on the shaft of the upper pulley, and in a few instances formerly buffaloes are said to have been the motive power.

The water-wheels in the Larut mines are from 4 to 5 ft. diameter, and from 2 to 3 ft. breast. The fall at each pump, its lift, and performance vary, and the following statement supplies all needful information on these heads:—

No.	Fall (feet).	Lift (feet).	Discharge, per min. per hour.	Ratio, Effective power.	Trough, Inclina- tion. Length (feet).		
1	5½	14.0	9.57	3588.75	18, or nearly 1.5	10	85
2	5	13.5	7.93	2841.25	43, or over 2.5	10	84
3	5 7-12	9.0	4.17	1581.75	128, or 7½	7	91
4	5½	20.5	4.27	1601.40	38, or over ½	13	92
5	5½	13.0	4.40	1672.50	10974, or 1-10	10	92
6	5½	10.5	8.04	3015.36	13, or nearly ½	7	84
Means	5½	13.4	6.36	2385.00	22, or over 1-5	9½	87

These pumps were selected indiscriminately from the Asam Kumbang and Topal sections, and the measurements were taken on a morning succeeding a night of heavy rain, when the wheels were working under favourable conditions.

ON UNDERGROUND HAULAGE—No. II.

SIR.—Hauling by main and tail ropes is almost the rule in the Durham and Northumberland coal mines. The hauling engine is sometimes placed on the surface, near the top of the pit, having the boilers adjacent to it; but this plan causes additional friction on the ropes, from the turns at the top and bottom of the pit, and as will be seen from the following examples, rope friction absorbs a large proportion of the prime power. The usual method is to fix the hauling engine near the bottom of the drawing pit, so as to bring the train of wagons direct into the sidings; this, if near the upcast pit also, will be the most advantageous position for the engine in getting its supply of steam from the boilers on the surface, and also in exhausting steam into the upcast pit.

The following example of a hauling steam-engine so placed in proximity to the upcast pit, and behind the drawing pit, in a coal mine in Durham, is a good illustration of the principle of hauling by two separate ropes and drums. The engine has two 24-in. horizontal cylinders, 3-ft. stroke, geared in the ratio of 2 to 3. The cylinders are placed 5 ft. apart from their centres; from the cylinders to the crank shaft the distance is 10 ft.; on the middle of this shaft is fixed the fly wheel, 10 ft. in diameter, weight 5 tons. At each end of the crank shaft a pinion is fixed, 4 ft. in diameter, working to a spur wheel, 6 ft. in diameter, at the side and on the same shaft, with each a drum is placed, the drums being 10 ft. apart from the middle of each. The drums are 5 ft. in diameter, 3 ft. wide, and are put in or out of gear by sliding carriages. The engine is also constructed to pump water, a small double-acting plunger-pump being placed at the back end of each cylinder. The length of steam-pipe is 133 yards, and of exhaust pipe 100 yards.

The engine plane is in two sections; the main way to the north is about 3000 yards in length; from a point on this plane 1500 yards in a branch runs off to the west, being 850 yards in length, or 2350 yards from the pits. While the set of wagons is at the pit the ropes are changed, so as to send the empty set of wagons into either north or west district, as required, without stopping the train on its journey to either extremity. The length of main rope required for the north way is 2900 yards, weight 5 tons 6 cwt., and of tail rope 5820 yards, weight 9 tons 2 cwt. The length of main rope required for the west way is 2200 yards, weight 3 tons 18 cwt., and of tail rope 4710 yards, weight 7 tons 2 cwt. The main rope is 3 in. in circumference, the tail rope 2½ in., equal 6½ lbs. per fad. The rope sheaves on the main rope are 5 in. in diameter, placed 10 yards apart, those for the tail rope are 8 and 14 in. diameter; there are other larger binding sheaves at turns, and the return wheels are 7 ft. in diameter. The rails are being laid at 28 lbs. per yard, properly fishy and jointed; gauge of road, 22½ in.; weight of wagon empty 5½ cwt., each carrying 9 cwt. of coal.

The gradients in the north way vary much; from the extremity there is a rise outbye of 1 in 74 to the summit, from that point to the west way end the fall outbye averages 1 in 108, from thence to the pits the average fall is 1 in 376. At the extremity of the west way there is a distance on a level, then a short rise outbye of 1 in 22, then an average fall of 1 in 55 to the west way end.

Experiments were made with the coupled engines with the object of determining the power developed in them, first by running the engines alone; second, running them by ropes only; and, thirdly, with a set of wagons, laden and empty, in each direction. With a set of 90 full wagons drawn outwards, the weight of the wagons and coal being 65 tons, and the speed at 48 revolutions, equal to 558 ft. per minute, on a steep gradient outbye, the indicated horse power was 88 in one cylinder and 78 in the other = 166 horse power. Steam pressure in receiver at same time 29 lbs. per square inch. Another trial with the same load on a level gradient indicated 135-horse power; the average of the two trials was, therefore, 150½-horse power. There is no automatic steam regulator by means

* The Californian wheel and Persian wheel are on the same principle. 1 ft. 4 in. all, distributed as follows:—Asam Kumbang, 19; Kamunting, 40; Tapal, 25; total 84.

of a governor with this engine; the steam is admitted or reduced as required by the attendant. The indicators were applied directly to the ends of the cylinders, not to pipes, the latter not giving correct results. With a set of 90 empty wagons drawn inbye, on a rise of 1 in 540, at 64 revolutions per minute, and a rope speed of 737 ft. per minute, the indicated horse power was 68 in one cylinder and 60 in the other, equal together 128-horse power, on the level.

The ropes when coupled together and run without wagons at 72 revolutions per minute, and a rope speed of 1054 feet per minute, the indicated horse power was 43 in one cylinder, and 34½ in the other, equal 77½-horse power; steam pressure in the receiver 26½ lbs. per square inch. With the drums disconnected from the engine the indicated horse power of both cylinders was 18.3, at 68 revolutions per minute and 32 lbs. steam pressure. It thus appears that the power lost in rope friction and engine friction inclusive is 51 per cent. of the power exerted in drawing out the full wagons, and 60 per cent. loss on the power exerted in drawing the empty train inwards; of this 12 per cent. is absorbed by friction in the engine alone.

Similar experiments were made with trains in the west way, giving in result 74-horse power absorbed by the friction of ropes and engine at 72 revolutions per minute. Though this way is much shorter than the north way, the number of curves in the west way cause the rope friction to be nearly equal to that of the north way, indicating the importance of having main roads straight and as free as possible from turnings. The average horse power required to bring the laden wagons out from the west way at 64 revolutions, and a rope speed of 781 ft. per minute, was 123; steam pressure 27 lbs. per square inch. There were 80 wagons in this train, equal to a weight of 57½ tons. The gradients were a fall of 1 in 540, and on another part level.

The power required to take the set of 80 empty wagons into the same way was nearly 125-horse; in a rise of 1 in 51 and on the level steam pressure 29 lbs., revolutions varying from 58 to 70 per minute. It will be observed that the last power corresponds nearly with that of the empty train in the north way, though the number of wagons in the train is less, and the distance shorter; this may be accounted for by the curves in the road, by the deflection of the tail rope over a sheave to work a pump, and by the more frequent application of the brake in running inbye, for which it would be difficult to give the amount of power absorbed. The total weight of a train of 90 laden wagons is 65 tons to be drawn from the north way; at the starting of this load the weight of the main rope (5 tons 6 cwt.) would have to be drawn, as well as half the weight of the tail rope (4 tons 11 cwt., or together 10 tons 17 cwt.; about one-sixth of load); but the rope friction being much greater than the wheel friction, the great absorption of power by running the ropes only in comparison with running with full and empty trains is in some degree accounted for.

Having at some length detailed these experiments, principally because they must be useful and interesting to practical mining men, as showing the sources from which arise loss of power in working engine planes, and how these can be in some degree abated by straight roads and uniform gradients, as far as practicable, straight pull from the plane to the engine, and easy running and light sheaves for the ropes. Whether the prime mover of the engine is steam or compressed-air, the result will be much the same in useful effect performed by the engine.

M. E.

ECONOMY IN FILLING SKIPS.

SIR.—For the information of Mr. Henry Brewer I may inform him that the plan for filling skips which has occupied his time and attention so long is a very old plan indeed; it was at work in Cornwall some 16 years ago, and the writer of this had a similar plat and appendages fixed in an iron ore mine about six years ago at Winford, Somersetshire, yet, although the stuff is handled over by the trammer after a fall of (say) 8 ft. from the top to the bottom plat, chokes sometimes occurred which did the shoot no good. Has Mr. Brewer ever tried it, and found it work satisfactorily at the mine he is engaged at in Bailen, Spain? J. J.

Nov. 5.

MACHINE MINING—THE ECLIPSE DRILL.

SIR.—I noticed in last week's Journal a description of the Eclipse rock drill. Referring to the specification of the patent for this drill (Elliott, De Pass, No. 629, A.D. 1878), may I ask you to find room for the following passage quoted from it, and the succeeding one quoted from the specification of my patent, No. 3342, A.D. 1874:—
"The valve box, A', is provided with exhaust ports, c, c, for the valve pistons, and these ports are carried across and to opposite ends of the valve box, and they lead down into the steam cylinder, C, through passages, d, d. From this point the exhaust is carried by a groove or recess, f, turned in the piston, E, and thence by the openings, g, g, in the cylinder to the main exhaust port, and without having any connection with the steam or air which is in either end of the cylinder. This constitutes a very great improvement in the invention."

"The operation of the machine is as follows:—When the air or steam enters the valve box it is admitted between the valve pistons, and supposing the valve to be resting against the lower end of the valve box, it will be seen that the exhaust from this end of the valve box is closed because the main piston lies over the passage, d, whilst the other end of the valve box is free to exhaust because the groove or recess, f, is in position to leave open the port, c, through the tube, d, and thence from the recess, f, through the opening, g, into the main exhaust port, D. It follows that the valve would receive a pressure upon its lower piston, whilst the other end of the valve could not, therefore the valve must rise, and in doing so the main supply port, j, to the lower end of the cylinder is opened, and at the same time the exhaust from the upper end being freed, the piston immediately begins to rise, and its recess, f, on reaching the exhaust port, c, of the lower end of the valve box, allows the steam or air under the piston, a, to escape through the tube, d, and through the passage, g, into the main exhaust port, D. This returns the valve back to its first position, and in doing so the main supply port, j, to the upper end of cylinder is opened, and the exhaust by the lower main port, f, is freed, which causes the piston to descend towards the rock, and the groove or recess, f, on reaching the exhaust port, c, of the upper end of the valve box, allows the steam or air above the valve piston, a', to escape through the tube, d, and thence through the passage, g, into the main exhaust port. This downward stroke of the piston closes the exhaust from the lower end of the valve box, and opens the upper end, thus causing the valve to rise and continue the motion. It should be observed that the openings, g, g, are connected with the main exhaust port, D, by an opening, x, cast in the cylinder, and which is shown by the dotted lines in Fig. 6. The small ports, i, i, in each end of the valve box are made so as to extend just within the valve pistons, and they serve to admit a puff of air or steam to accelerate the starting of the valve, and as the valve moves from either end of the valve box these pistons instantly close the ports alternately."

The third claim is—"The use of ports arranged in the valve box substantially in the manner shown being carried across to opposite ends of the valve may be controlled by the groove or recess in the main piston, as herein described." And the fourth claim is—"The means employed for controlling the valve by the exhaust steam or air from opposite ends of the valve box, and without having any connection with the steam or air which is in either end of the main cylinder substantially as herein described." (Eclipse patent, 1878.)

In my specification, after describing the method in which a slide valve is actuated in a supplementary cylinder by two small pistons behind which steam or air is admitted from the principal cylinder through two openings uncovered alternately by the main piston, I add—"Another arrangement which I sometimes use to regulate the movement of the small pistons, I, I, and the valve, g, is the following:—I make a small opening through or round the piston, I, I, through which the steam passes, and thence through the passages, m, m', to the exhaust pipe. When one of the pistons, I or I', has travelled far enough to cover the openings, m or m', the steam accumulates outside the piston, I or I', and forces it together with the

valve to the other end of the small cylinder, *f*. In this arrangement the ends of the passages, *m m*, should pass into the cylinder, *a*, near the centre of the length of the latter in order to prevent the pistons, *l l*, from having too short a stroke."

Referring to these two specifications, may I ask the patentee or manufacturers of the Eclipse drill to say in what respect the arrangements as described above differ, for to me they seem to be in every material point absolutely identical?

The fifth claim in the Eclipse specification, for the use of a rotating bar and screw, formed of one piece of metal, or connected together, by means of which the feeding and rotation are made one operation, is by no means new (see No. 2013, A.D. 1875).

Southampton Buildings, Nov. 6.

E. EDWARDS.

THE GREAT NORTHERN RAILWAY.

SIR.—Landowners' rent rolls have been subjected to serious rebate by reason, thanks to modern idiosyncrasy, of so-called free trade, forsooth, with States which, in lieu of reciprocating, levy prohibitory duties on our manufactures, culminating in one great cause of the prevailing stagnation of industry and commerce in this kingdom. Without enumerating the various countries entering into this category, which would necessarily launch me into unpardonable prolixity, it may suffice to name Russia, which, depending chiefly on this country for the disposal of her cereals, timber, flax, &c., imposes insensate fiscal restrictions on our staple exports. Land is offered in the most fertile zone of Russia—Podolia, Ukraine, Poltava, Koursk, and Chernigow—at 25 roubles the dessiatine, or 26s. the English acre, without finding buyers; descending, in the steppes of the Crimea, to 75 copecks, or 9s. 1d., an acre; the average freight of Russian grain to this country in 1878 being under 4s. a quarter. With the improvement of her vast water-courses, and consequent greatly reduced cost of transport, the landowner in this country will be placed in a still worse position, which already is reacting so severely on the agricultural labouring population. Is it possible to realise the fact of still greater disaster befalling the landowner and his dependants through the illegal conduct of the Great Northern Railway Company, as hereinafter set forth? The tocsin has sounded, and the law must be respected and carried out in its integrity. Our legislators have enacted just laws affecting the exploitation of railroads, by prohibiting any preference to be given to any particular element of traffic, than which nothing can be more distinct and set forth with greater perspicuity in the Traffic Act, quoted in my letter in last Saturday's Journal. But let us contemplate the application of the law. Mineral property in the vicinity of a railroad having access to the Metropolis, as the Great Northern Railway is *ipso facto*, as the law is now contravened, greatly enhanced in ephemeral or transitory value. Competition with sea-borne traffic, my correspondence in the Journal of Oct. 19 and 26, and Nov. 2 shows, has reduced the Great Northern coal rate to less than 3d. per ton per mile to the Metropolis, entailing a heavy loss on the shareholders who, along with their Midland fellow-sufferers, have already been victimised, according to the Times, to the terrific loss at the rate of 300,000l. a year in 1871 in this identical coal traffic. Fraser's Magazine of this month states—"The railways of the United Kingdom have, as commercial undertakings, concealed their items of expenditure." We know how sensitive the Stock Exchange barometer is. The Railway Times of Oct. 19 states—"Accusations of paying dividends out of capital have been made against the Great Northern." The Times observing—"The necessity of a radical change of the system of audit is imperative." An immense undue advantage accrues to the landholder simultaneously owner of mineral property over the ordinary landholder bereft of the benefit of any such geological boon, and restricted to the surface of the soil, who in lieu of less than 3d. per ton per mile transit cost is mulcted with 1s. 3d., or fortyfold more than his neighbour. Were the same measure of justice meted out to the surface landowner we should witness an immense increase in the value of land for the cultivation of agricultural produce, and for building sites—the greatest conceivable benefit conferred on the working classes, which I shall develop in my next letter. The building trade would be raised from its prostrate state. The question is too serious to brook delay, and the mandate of public opinion, under the aegis of the inviolability of the law, will be supreme. How deplorable if the Glasgow Bank collapse should be the forerunner of more terrible disasters on the part of incriminated officials. Towering spirits have fallen, and it is to be wished the railway magnates may have occasion to reiterate the words of a crest-fallen octogenarian diplomatic celebrity—"Nous avons souffert sur ce naufrage, qui obscurcissait notre grandeur, et il s'est évoué!" I have had the privilege of ventilating my steps at the Board of Trade and at the Railway Commissioners' department, and I have not met with anyone dissenting from or controverting the views I have enunciated. "Le respect ferme la bouche."

WILLIAM JOSEPH THOMPSON.

6, Fitzwilliam-road, Clapham, Nov. 7.

CITY OF GLASGOW BANK—UNLIMITED LIABILITIES.

SIR.—The following letter appeared in the *Mining Journal* August, 1868, and the stoppage of the City of Glasgow Bank justifies its reproduction after a lapse of ten years:—"The success that unquestionably attended joint-stock banking from its first introduction into this country indicated rapid growth and wide spread public recognition with cheering prospects of permanent prosperity whenever the rules and principles of sound finance were observed. For a series of years these undertakings commanded great and deserved attention, being favourably regarded as profitable mediums for the safe employment of capital. The profits were great and the dividends large, while the business was healthy, remunerative, and capable of extension. The shares rose in price, from the demand exceeding the supply, and to all appearances sprung solely from a desire on the part of the investing public to embark therein. Thus commenced that mania for banking institutions and growth of premiums on original shares that ultimately ended in grief and disaster to so many associated therewith. Prospectuses of new companies were issued in rapid succession, and received with eager greed by an exacting public. Thus encouraged, speculative as well as legitimate promoters entered the field, and while the former fed the morbid desire to realise unreal wealth in the shape of fictitious premiums, or otherwise visionary profits, through buying and selling shares in an inflated and feverish market, the latter succeeded in establishing those great useful and profitable undertakings that now occupy such exalted—nay, necessary and indispensable—positions in the conduct and administration of the commercial affairs of the nation. It appears to us, however, that banking business and banking risks are still very imperfectly understood by the investing public, notwithstanding the revelations of the years 1866, and 1867 and the direful attendants on the collapses of so many establishments. . . . That joint-stock banks are trading companies they can be no doubt; that profitable trading companies should command a market premium for their shares is beyond question, and further that the prestige of past successes should command confidence in the future administration of affairs is likewise certain. Hence the London and Westminster Bank stands out not only in an exalted but also in an unrivalled position; still the question arises, will the dividends on 2,000,000l. capital materially augment the gains on 1,000,000l., when probably the current and deposit accounts, now amounting to 19,000,000l., will not augment in proportion? Should the dividend be reduced from 24 to 12 per cent. on the 20l. paid, price of shares 71l., is equal to about 30 years purchase, and from which no one can retire without being responsible for obligations three years after transfer of shares, with direct commitment to future calls of 80l. a share in case of necessity. Surely the late crisis will prove of little avail if banking companies be not regarded with some degree of suspicion. The many failures and the sad and lamentable disasters entailed on thousands of individuals should act as a warning to others, and although all must admit that the 2500 proprietors of the London and Westminster Bank are as safe and well protected as they possibly could be with any similarly constituted company, still we contend that six to eight and up to ten years purchase of dividends is enough to give as a premium for embarking money in any trading concern, no matter how bright

may be the prospects, or extended its influence, for experience has shown that the most affluent and prosperous undertaking may be rendered prostrate by the effects of circumstances against which the most elaborate and guarded precautions would not prevail."

Ten years ago the price of shares was 71l. against 60l. this day. The liability of shareholders between themselves is increased from 80l. to 160l. per original share; 30l. per share has been called up, 20l. capitalised and 10l. added to reserve, all of which was lost through Collie and Co. The liability to the commitments of the bank are unlimited, hence the rich will have to pay for the poor in case of disaster and grief. The 1-50,000 part of the bank ten years ago was worth 71l., now it is marketable (two shares) at 120l., with 30l. called up, or (say) 90l. as against 71l. a decade ago, with one moiety of the direct responsibilities.

The collapse of the City of Glasgow Bank spreads misery and desolation broadcast, and shows clearly that unlimited liability is not applicable to joint-stock banks—1. The directors and executives are dealing with the money of others and not their own.—2. The shareholders have no control over their own responsibilities or the conduct of their business.—3. Experience proves that directors and servants are only mortals, and have a leaning towards themselves and friends, hence the gigantic advances made on speculative and questionable securities by the City of Glasgow Bank.—4. Anyone acts absurdly who commits himself to unlimited liability when he can exercise no voice or control on the actions of the executive; hence we advise one and all to realise without delay shares in unlimited banks, for in our opinion it is only a question of time when the best will succumb. A stern chase is usually a long one, but the finance of the day is based on competitive speculative profits. Security has been succeeded by forced business, which partakes more of the principles of pawnbroking than healthy and legitimate banking.

The cost-book is unlimited liability, with these distinctive elements from joint-stock banking that shareholders supervise and transact their own business, with the power of retreat at any moment, and are liable only for their individual proportion of indebtedness, while such mines as the following possess attraction and prospective expansion in no instance equalled in joint-stock banking—Pant-y-Mwyn, East Pant-ddu, Lead Era, Pateley Bridge, and others of similar calibre and promise.

R. TREDINNICK,

Consulting Mining Engineer.

Union-court, Old Broad-street, London, Nov. 6.

NEW QUEBRADA COMPANY.

SIR.—A fortnight ago you were good enough to insert a letter from me suggesting to the directors the propriety, for reasons then stated, of furnishing to the shareholders some information as to the condition of the mine and its position with regard to the Railway Company. No reply has been made to that suggestion, but I cannot help thinking that there is greater force now even than there was then in the reasons I urged in favour of publicity. I stated that certain parties were evidently under the belief that a considerable improvement had taken place in the mine, particularly with regard to the output of mineral. Since then it has become known in the market that a sale of a large quantity of Quebrada ore—it is said even 1000 to 1500 tons—has been made within the last few days. Such a quantity as this not so very long ago would have made a sensation. I will not do the new directors the injustice even of implying that information such as this indicates is withheld. But, Sir, so long as we do not know what is going on the effect is the same, and I do say that any shareholder who may now be induced to sell his shares, if there is substantial improvement in the condition of the mine, will have grave cause for complaint.

A SHAREHOLDER.

THE RICHMOND MINE.

SIR.—On Wednesday next this grand property will be either considerably enhanced in value or it will very materially suffer—which it shall be must depend upon the action of the shareholders. If shareholders will show determination to have a united board of directors they must support the Chairman and his party—which is commonly termed the Probert section. They will thus secure for this company a prosperous future. In spite of the great mistake made in sending out a commission of enquiry to the mine, a second enquiry has been made—no doubt to support the report given in by the first batch. It is too late in the day now to blind the shareholders. We are perfectly satisfied with the mine, and its management there is also satisfactory. A little judicious weeding of the London board of directors is all that is wanted. I, for my part, shall decidedly support the men who appear to me to have the greatest knowledge of mining—I need scarcely say who they are.

A SHAREHOLDER.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR.—As a shareholder of five years' standing, and holding over 500 shares in the company, I naturally feel a deep interest in its prosperity. I have ever regarded it as a most valuable property if conducted by men of practical experience and honesty at the mine. I have had proxies along with a circular forwarded to me by Hon. Randolph Stewart, asking me to join in ousting some of the directors recently appointed, as the company's interests will suffer if they are allowed to remain, and inferring that the report of the late committee of investigation, if carried out, would bring woe to the company. I have no acquaintance with Mr. Probert or any member of the board, but cannot help feeling that it would be unwise to take such a step as removing directors until we have had time to study Mr. Probert's reply (only received to-day) to the committee's report. Now, permit me to call the attention of my fellow-shareholders to the following plain facts:—At the general meeting of shareholders on May 20, 1875, as reported in the *Mining Journal* of May 22, the Chairman, Mr. Elliott, stated that "the refining works would not only save about \$20 per ton on the actual cost of refining, but that it would enable us to get money from our produce in three weeks instead of three months." At the same meeting Mr. Bridgwater stated that he had received a letter that very day from Mr. Probert referring to the refining process, in which he said—"The process is a great success, and the machinery works like a charm, reducing the expenses quite 30 per cent." When the committee was appointed in August, 1877, and the refinery had been in operation for upwards of two years, from March, 1875, till July, 1877, we only got 27s. 6d. per share of dividend during all that period. Since the committee was appointed, 15 months ago, we have received 3l. 2s. 6d. per share of dividends; that does not look like woe to the company. When the committee was appointed shares were freely selling at 4l.; now they are 10l., or a rise in market value of 324,000l.—that does not look like the labours of the committee had done harm. Then we had borrowed on debentures in 1876, 37,800l., a considerable portion of which has been paid off, and as much cash over as would pay the whole—that does not look like a back-giving concern.

Surely our shareholders will pause before they change the present direction, and only after mature deliberation and weighing both the committee's report and Mr. Probert's reply. When Mr. Probert started the Rozan process of refining great things were to be done by it. From the starting of the Rozan process at Eureka till the committee visited the place, there appears from Mr. Probert's reply, now issued, nothing but a series of accidents and I presume blunders, but after the visit of the committee the aspect of affairs was completely changed, and profits of great amount were then made. I do not say the committee did all this, but Mr. Probert appears to have waked up, and it is curious to think that profits could only then be found to any great extent. Mr. Probert, in his reply, overlooks the facts as brought out by the committee that coke costs at the mine 6s. 6d. per ton, and labour about 4s. or 5s. a day, while in England coke is 18s. per ton and labour 4s. or 5s. a day. Let us, then, try what would be the result of sending 1000 tons of base bullion to Liverpool to refine, where we could at once dispose of the lead, and get the precious metals; and I offer to get charters for the 1000 tons in 200 ton lots from San Francisco to Liverpool at 35s. per ton freight. There would be no fear of speculation by the way, and if it succeeds then bring Mr. Probert's refineries to Liverpool, and appoint him refining manager at a good salary. I would like to see Mr. Probert liberally

dealt with, as I think him honest, but a good deal wrong about refining in Eureka. A HOLDER OF OVER 500 SHARES.

Scotland, Nov. 7.

ECONOMIC MANUFACTURE OF ZINC.

SIR.—Under the above heading there has been described in the two last issues of the *Mining Journal* Messrs. Binon and Grandfil's process for the treatment of complex ores containing galena, blende, &c., and which, on account of the specific gravities of the component parts being so nearly similar, have hitherto completely eluded all attempts at mechanical separation. There can be no doubt that any process which will successfully and economically effect the separation of the various metals must result in large returns to all concerned—the metallurgist or chemist, or both, as the case may be; the miner, to whom the mineral is now almost, if not completely, valueless; and to the country at large by bringing into use many valuable metals hitherto wasted. The bluestones of the Parys Mountain and Ireland, and other mixed ores found in abundance in this and other countries, would at once find a ready market; therefore, any efforts to secure so desirable results should be hailed with satisfaction. Having had some experience with these mixed minerals I should like to offer a few remarks upon the process of Messrs. Binon and Grandfil, as I think the manipulations and results they have described will not be so easily carried out in regular practice. The furnace described appears to be a modification of the old Carinthian and English processes of smelting zinc ores, and also of Graham's patent, and will be found liable to all the inconveniences of those systems, beside others inherent in itself. The furnace bottom and the boxes under same being of cast-iron will, from the intense heat required to distil zinc, be liable to warp and crack, and consequently draughts of air will pass through the crucibles, oxidising the zinc vapour, and converting the metallic lead into oxide of that metal, which will very rapidly destroy the vessels. The calcined mineral containing oxides of lead, zinc, iron, &c., being a fusible compound will be liable, at a temperature lower than that required for the reduction of the zinc, to melt, and running down to the bottom of the crucible (which, although not stated, has I presume a porous stopper to prevent the charge from dropping into the cast-iron box underneath) will present an effectual barrier to the further descent of the reduced lead, and also result in the destruction of the crucible. The admixture of the lead with the zinc in the ore being so extremely intimate I do not think it possible that any considerable portion of the former metal can separate itself from the accompanying mass and drop into the cast-iron boxes provided for its reception. The claim for minimum of non-cooling of the retorts during discharging and charging cannot, I think, be substantiated, because there being an opening both at the bottom and top of each a current of cold air must be rushing through them during part of this operation, whereas with the ordinary Belgian and Silesian retorts there is but one opening, and consequently no draught through them. A few years ago I designed a spelter furnace, having vertical retorts, and heated by gas, but it was subject to all the disadvantages named and many others; the principle is undoubtedly the best, but the attendant difficulties appear insuperable. Messrs. Binon and Grandfil appear to confine their process to minerals containing only two metals, but it is very rarely indeed these complex ores are found in that form. Copper almost always accompanies them, and frequently gold, bismuth, antimony, and so on. How do they propose separating these? It will also be interesting to know the loss in calcining, on account of the great heat necessary to properly roast blende, of lead, silver, and other volatile metals. I cannot think the problem of the proper treatment of these ores has been solved by the process described. To chemical metallurgy I believe we must look for success.

Ripley, Derbyshire, Nov. 5.

CHARLES BOUNDY.

PROSPECTS OF CORNISH MINING.

SIR.—It is stated in well informed circles that the minimum prices of metals has been reached, a confirmation of which may be inferred from the rise of something like 7l. 10s. per ton on tin, and a corresponding advance in copper ore. In October, 1843, the standard price for common tin reached the unprecedented low price of 48l., and for copper ore 80l., the reaction from which caused a rapid rise in the market value of all mining stocks, and that a repetition will follow the great depression through which we have lately passed can be gathered from the fact of many of the leading mines of the county having already taken the start. It must be plain to persons of the most obscure ideas that the mines which have tided over the late calamitous times are now passing a transition state to that of profitable investment, paying a good interest on the capital to be invested, with the certainty of doubling the amount of purchase money in the next few months. Following a similar crisis the Devonshire Great Consols shares (1024ths) in 12 months went from 27s. to 650l. each, remaining at this price for years, paying about 50l. per annum dividends. Here follows a few mines in which the reserves of mineral were probably never in excess of the present, while the shares have receded in market value in some cases to as much as 75 per cent.:—Dolcoath from 80l. to 30l. each; Tincroft from 70l. to 10l. each; Carn Brea from 120l. to 40l. each; and South Caradon from 400l. to about 60l. A person investing a few pounds in the lot is safe to reap his reward in a short time. There is an instance of a much greater depreciation of market value than those above named from no other cause than the apathy of the investing public. A mine some 24 years since sold at a market value of 40,000l. The pumping machinery (a small rotary steam-engine) becoming inadequate to cope with the increased water, operations were suspended pending the erection of more powerful machinery. The last three months working under such difficulties it cleared a profit of over 1000l., yet, strange to say, one half of its entirety can be purchased for 500l. It may be said to be in its infancy, being only 50 fms. below adit, and situate in the centre of the richest mining district in Cornwall, requiring an outlay of only 2000l. on machinery account to establish its value as second to none in the county. Another mine in the same district, where at the adit level a course of copper ore 3 tons to the fathom has been driven over for 40 fms. long, and opening sufficient mineral to pay for machinery required for its deeper development without calling on the shareholders for assistance, is selling at a nominal value of 2l. per share, or 5000l. for its entirety, being situate adjoining and parallel to a mine that some years since, under precisely similar circumstances, rapidly rose from 100l. to 2000l. each (98ths). Such are the chances presented to those who take time by the forelock, and have the heart to lay out a few pounds in a judicious selection of mining properties.—St. Day, Cornwall, Nov. 6.

CHAS. BAWDEN.

LEAD MINING.

SIR.—In the interesting article on lead mining in last Saturday's *Journal* after giving the decadal statistics in which Cornwall appears under such a very disadvantageous aspect, it is remarked "Land under such a very disadvantageous aspect, it is remarked, while other countries, especially those in the South (by which I presume Cornwall and Devonshire are meant), look as if they were going the same road." As far as actual production is concerned the figures prove a great deduction, but from what I saw in Cornwall and Devonshire recently I conclude, so far from lead being exhausted in these counties, there is a grand field for developing lead on a very extensive scale. In both counties there is a vast territory of virgin and partially worked ground of a highly promising character. Permit me to give an instance or two. At St. Columb I visited a place where splendid lead had been struck at a few fathoms in depth in the neighbourhood of proved champion lodes, where at small cost the place could be developed to profit even at present low prices. In Devonshire I visited another splendid mine, in which has been developed a lode hard and dry containing thousands of tons of lead within 100 yards of this royalty. A company, I believe of Scottish gentlemen, have since my visit struck a splendid lode. Another mine to the south was about being re-opened, and I was informed on very reliable authority that it also was one of the capabilities of production. In the mine in Devonshire I first visited the quantity of lead in the halans appeared to be very great. Digging at random a little on a spade and washing it it was surprising

to see what a quantity of lead was in it. There is ample water-power for washing, so that any company taking such a royalty might make a fortune from the halvaus alone, in which were about 23,000 cubic yards of stuff, and from a careful assay made were estimated to contain 1500 tons of lead, and an amount of silver which seemed almost too fabulous to specify.

Fearful as are the times, and still more fearful the various apprehensions of miners and speculators, yet we must not conclude that there is no silver lining to the dark cloud now enshrouding our mining and other industries. I believe the cloud will pass over, and both capitalists and labourer will learn much wisdom from the past. All round we went more confidence and right feeling between capital and labour. One thought struck me when in the South what a splendid opportunity now presents itself to capitalists for buying lead and other royalties. Another year not only may we have reached the lowest point of depression, but a steady rise in prices may have set in, trade may and I believe will revive, and were capitalists will receive a fair remuneration for their investments, and labour will be adequately rewarded, as it is generally in prosperous times. The croakers over England's declension will have retired, and I trust to have a Rip Van Winkle sleep. Let every one banish gloom and apprehensions of greater disasters. Great storms are generally followed by genial weather, and let us hope and trust that the great crisis through which we are passing may be overruled for the permanent advantage and happiness of the whole country.—*Ulverston, Nov. 4.* F. G. S.

THE CORNISH FELSPAR COMPANY.

SIR.—This company has only been a short time established, but notwithstanding this they have had several orders in, and they are now shipping at Fowey for Belgium 200 tons as a sample cargo. This house uses 3000 tons per year, and samples are sent into other houses that use the felspar very extensively, both in England and abroad. The company will, no doubt, do a very extensive business, and it is said that the shareholders will receive in dividends at least 50 per cent. The felspar is found close up to the surface, and 250,000 tons is now open and exposed to view, and the profits are over 10s. per ton. This must be a safe and profitable investment.

MINERAL INSPECTOR.

MINING IN NORTH WALES.

SIR.—I think the remarks by your North Wales Correspondent in last week's Journal as to "Daniels' Mine" ought to be contradicted. It is simply worked by a mining company, as many others are worked in this country, and not for the benefit of the "Daniels' family."—*Goginan, Nov. 4.* ABSALOM FRANCIS.

PANT-Y-MWYN MINE.

SIR.—Messrs. Watson Brothers in their criticisms on this property, contained in their last week's article, state that their first acquaintance with and intimation of its existence was hearing the most extravagant reports as to its riches, and also of the introduction of the shares on the London market at 5s. per share. With regard to the former, we do not intend herein making any allusion, but flatter ourselves on being the introducers of this valuable and now noteworthy property into the London market. In reply to their latter observation, we would request them to refer to the Journal week by week from the issue of June 22 to that of Aug. 10 (eight weeks), when they will find we advertised these shares not at 5s. per share but at 3s. 3d., 3s. 4d., 3s. 5d., 4s. 1s. 3d., 4s. 4d., and 4s. 10s. respectively. Surely during this period the advent of this property on our market must have become cognizant to Messrs. Watson, as also the above-mentioned prices; why, therefore, do they withhold these facts? If, on the other hand, they were ignorant thereof, we think they would do well to inform themselves fully on such points before committing their criticisms to print.

Bishopsgate, Nov 7.

JONES AND HOUSTON.

PANT-Y-MWYN MINE.

SIR.—A man swearing that black is white would not change the colour, neither will Capt. Hughes, "Vincit Veritas," and others alter the effectiveness of the machinery in this mine by the assertions they make regarding them. When Capt. Hughes asserts to Messrs. Watson Brothers and their agent that the pumping-engine is a 9-horse power, working to 36-horse power, he displays the most consummate ignorance that can be conceived. When I was there this grand engine, which Capt. Hughes boasts so much about, was lifting about 45,000 lbs. per minute—that is less than 1½-horse power, with a steam pressure of 38 lbs. to the inch. Nothing, therefore, can be more evident than that this wonderful engine, with the present arrangement, cannot be worked to more than 3-horse power. Both Capt. Hughes and "Vincit Veritas" must be suffering from a mental jaundice or idiosyncrasy of the brain when they state that the machinery is sufficient for present purposes. If this be true, why did they stop the driving of the western end lest the water should drown the mine? And how is it that they have had so much trouble at times to keep the mine dry? "Vincit Veritas" would have your readers believe that this mine is so largely developed that the imaginative powers of Messrs. Watson Brothers' agent were incapable of grasping so comprehensive and complicated a system of operation. If this gentleman is honest in what he writes, and I have no reason to doubt, he shows clearly that he is the party labouring under an hallucination, and not Messrs. Watson Brothers' agent. The latter deals in facts and figures, but the former seems to rest on the baseless assertions of their so-called engineer, whose vision is dimmed and distorted by a sight of his own intellectual brightness. On the dressing department there is only one article that any sensible engineer would have at a gift, and that is one of Green's patent jiggers, which was being used for jiggering slimes. The pitwork is of the same rude description, and fit only to be thrown away. The good management of the mine has been, and is, boasted of. Do the directors know that the so-called stopping is digging here and there after the pockets of ore; sometimes driving, sometimes rising, sometimes sinking, and men all working on day work. Wonderful management? No wonder for Capt. Hughes to challenge any engineer to say that the mine is not properly developed when he sees a system so perfect. (?) It would be very interesting to know how the estimate of reserves is made out. Let anyone average the value of the lode for the whole distance that the levels are driven, and where will he find 2000 tons of lead discovered?—aye, where will he find 1000 tons? I wish, however, to say that I have never seen a little mine more promising in itself, and never saw one so badly used, and money squandered in such rubbishing clap-trap machinery.—*Llanrust, Nov. 5.* JNO. ROBERTS.

PANT-Y-MWYN MINE.

SIR.—No doubt readers of your valuable Journal have observed from time to time most astounding and unfounded remarks made by Messrs. Watson Brothers respecting this valuable property. They say they would at all times rather praise than censure; but if they were deeply interested in our mine doubtless we would get a fair share of the former. We can all see that Messrs. Watson Brothers take great interest in obtaining information from parties connected, as they state, with this mine; and they inform us that to erect proper machinery to cope with the water (a sea of water as they call it) would require about 30,000. If that is the way Messrs. Watson Brothers play 50 men to raise 60 tons of lead ore, at a cost of about 200l. per month, how I raise ore, but when their Mr. W. H. Watson pays his visit to Wales (see *Journal*, Nov. 2, page 1204 and 1209) he had better beforehand call on or instruct me on the erection of machinery and mining generally. Then he may bear in mind that he will be talking to a man of 40 years practical experience, in under water, which I believe all shareholders will be proud to hear, but we must turn to the course of the mine. When we can get ore raised by miners at 12s. 6d. per ton, which were once under shafts and drive levels to meet the large wheels at the bottom of the shaft from where it is raised to surface, this may enlighten Messrs. Watson Brothers how to work a mine with 60 men and raise 60 tons of ore at a cost of about 200l. per month, which I will prove when Mr. W. H. Watson pays a visit to Wales. Allow me to state to the public that whoever informed Messrs. Watson Brothers

it would require 30,000l. to erect pumping machinery to cope with the water in our mine, and also that the mine is not worked in a proper manner, I most emphatically assert the informant can know very little about water pumping, as also about mining, notwithstanding his supposed great knowledge of the Pant-y-Mwyn and the district, and it is to be regretted he did not make use of his knowledge and take the mine before we did. In conclusion I beg to state that this mine is worked by sinking shafts, driving levels, opening out ore ground, and then stopping, and not running here and there after pockets of ore, as stated, and I challenge any experienced mining man to prove the contrary. As for pumping machinery 5000l. would cover everything required, even should we come into Messrs. Watson's "sea of water," and our present engine will take us 20 yards deeper than we are now. THOMAS HUGHES, Manager. Nov. 4.

PANT-Y-MWYN MINE.

SIR.—I feel a degree of reluctance in again troubling you to insert a letter in reference to the above mine, but in last week's Journal having observed that Messrs. Watson Brothers in their circular were as industrious as ever in their endeavour to disparage the property and its management, notwithstanding the numerous letters that have appeared from time to time in its favour, elicited through their uncalled for criticisms. I was not a little surprised at their observation "that their object is, as it has ever been (?), to support legitimate mining." Such a remark is obvious in the case of Pant-y-Mwyn. I will not on this occasion encroach on your space by answering all their questions in detail (which are chiefly recapitulations of what they have already said), and I think have been in the main answered by other correspondents in your valuable Journal. With regard to the shares being introduced on the London market at 5s. per share in the first instance, I beg to state that to contradict this, and refer Messrs. Watson Brothers to the number of the Journal of June 22, at which date they will find the shares advertised for sale at 3s. 3d., and even at 5s. per share some consider them very cheap, as it may be remembered that only 10,500 shares have been issued, which would make the market value of the property represent upwards of 52,000l. The working expenses are a little over 200l. per month (as I have previously stated), and the present monthly returns of lead—60 tons—sufficient, I think, to show a profit of 5000l. a month, or 60,000l. per annum. I should, indeed, be pleased for Messrs. Watson Brothers to ask to hear that the D'Ereshy Mountain Mine (which I think they introduced to the public) could show such brilliant results. The shares on which 20s. was originally paid were, I believe, worked up to 100s. per share, representing 51,200l. for the whole property, which I do not think has up to the present time sold a single ton of ore, so that Messrs. Watson Brothers should bear in mind the old adage, "People who live in glass houses should not throw stones." It much against my inclination to have to make these observations, as I should be very sorry to willfully depreciate the value of any mining property, but am only taking a leaf out of Messrs. Watson Brothers' book.

In reference to the letter of the secretary (Mr. E. Carver), which appeared in the *Mining Journal* of Oct. 26, page 1193, is to the effect that the company "have secured the lease on that portion of the sett which they are now working, and is very extensive, and the draft lease for additional land was in possession."

With regard to water springing out in the mine, the directors are quite alive to its probability, and now that an important discovery has been made at Modlyn Shaft I have been informed that they have contracted for a powerful engine to be erected forthwith through the present machinery is adequate for all present requirements, so as to reach the course of ore before alluded to, worked from Griffith's shaft. In Messrs. Watson Brothers' issue of the 5th ult., page 1192, and in order to corroborate my statements I append the following extract from a disinterested and private report, made on Oct. 17 by Captain Wm. Francis, whose truthfulness is too well known to need any comment:—

EXTRACTS.—"As this property is notoriously situated in one of the proved richest localities of the carboniferous limestone formation in the district, and is, in fact, a part of the formerly most productive, rich, and prosperous old Mold Mines, which returned upwards of 400 tons of lead ore per month for many years, I will simply observe that, geologically speaking, there are all the measures here necessary to ensure success and continuously increasing wealth in the deeper development of the property. From a careful and thorough examination of the underground workings, I conceive your present important discoveries to have been made at the upper western portion of the great bulk of ore, which will, I have no doubt, be laid open in the eastern and deeper workings. There are three east and west lodes in your grant, running for about one mile and a half in length, but one of which has been developed, and to a partial extent only, resulting in the important discovery made, but two cross-outs are now being driven to intersect the north and south lodes, which are within 12 yards of the latter and 3½ yards of the former veins. These are important trials, and may soon lead to new and valuable discoveries. Judging from the character of the middle lode at Griffith's shaft working, it is scarcely possible to find a more bold or promising lode for lead ore deposits, and full dependence may be placed in your lodes pure treating all the strata, with scarcely any diminished strength, showing, however, more compactness and productiveness as depth is gained, and altogether more dependable in their produce and bearing. Under the circumstances I have described it appears to me the best mode of laying open and developing the property is now being actively pursued in sinking the Modlyn shaft with all possible dispatch, so as to reach the course of ore before alluded to, worked from Griffith's shaft. This (Modlyn) shaft has now reached the main lode at about 20 or 30 yards under the adit level, about 12½ yards from surface, and I was greatly pleased to find that it has already struck into good ore ground, which will probably be found to be the top of the course of ore dipping towards it from Griffith's shaft and workings. The heading side of the lode has a beautifully polished slickenside, usually found highly congenial to lead ore deposits of magnitude, and frequently in close proximity to them. —In the meantime, using due precaution in diverting the water and otherwise, it is found that the present engine (8 or 9 horse power) is quite capable of coping with the water issuing from the various parts of the underground workings (being only surface water), and may do so for some time to come. It should be observed, however, that for present use, and particularly in the event of powerful machinery being required, there is the invaluable adjunct of a day level, which drains the mine 100 yards deep, driven by the River Alyn, near Mold, at a considerable outlay; and when the present discoveries are sufficiently developed by such means the deep workings, with any intermediate ones, can be carried westward in the most convenient manner on the three lodes for new discoveries in the deeper and richer bearing strata. Besides this, there is the old Pant-y-Mwyn Mine to the east, which is for all practical purposes separated by an impenetrable bar of ground from the present workings. It may not unlikely be deemed advisable to work this mine at some subsequent period in conjunction with the old mine, and in which, in all probability, good ore still remains in some parts of the old workings. This, however, is a contingency too remote to deal with at the present time, and I merely name it as having come under my observation. I find the necessary appliances complete and well adapted for the different kinds of ore stuff you have at present to deal with, being worked in the several self-acting process by a 13-horse engine, which also is used for drawing from the Modlyn shaft. There is also another small drawing engine (5-horse power) at Griffith's shaft, thus saving a considerable expense in horse work; and consider your present arrangements for dressing sufficient for greatly increased returns for some time to come to the extent (say) of 200 tons per month if necessary."—*London, Nov. 8.* ARISTOTLE.

OLD TREBURGETT MINE.

SIR.—In the Journal of Saturday last I observed a letter signed "Look Out," stating that the halven ores last sold from the Old Treburgett Mine realised 22s. per ton instead of about 12s. per ton. As to a screw loose with the late management, "Look Out" should have viewed this matter as well as that of the riches underground without spectacles which have magnifying properties, and before the mine was full of water and materials drawn to surface. A report of the mine was placed in the hands of a gentleman who was greatly interested in it (with a view of working it), and will be published for the benefit of capitalists should any more anonymous letters appear. As to the men offering me to work the mine on their own responsibility it is a deliberate falsehood. WM. HANCOCK.

St. Kew, Wadebridge, Nov. 6.

[For remainder of Original Correspondence, see to-day's Journal.]

THE METALLURGICAL USES OF TUNGSTEN.—Many attempts have been made to improve the qualities of iron and steel by the addition of small proportions of other metals. The most promising of all the experiments made in this direction turn on the introduction of certain proportions of tungsten or chromium; and although these alloys can scarcely be said to have acquired as yet a firm footing in commerce, still results of indisputable value have been attained. In these important investigations particular merit belongs to the eminent metallurgist, M. E. W. L. Biermann, of Hanover, who has devoted a great amount of time and expense to a thorough study of tungsten and chrome, and whose labours are beginning to bear important results. He finds that either tungsten or chrome may be advantageously incorporated with iron in the Bessemer process. He melts 3600 kilos. of grey pig-iron in a reverberatory furnace, and decarbonises it in the converter in the usual manner. He then mixes with it from 200 to 300 kilos. of a previously prepared alloy of tungsten, or of chromium, and iron. By this procedure he escapes all loss of tungsten or chromium by oxidation, and obtains a tungsten or chrome steel, in which either of these metals appears to be substituted for the carbon ordinarily present. This tungsten steel has been found to resist a greater breaking strain than the best "Huntsman's" steel. Puddled steel and iron and cast metal can also be decidedly improved in quality by additions of tungsten. These results are certainly not in accord with those obtained by earlier experimenters. But this is easily explained if we consider that many so-called tungsten steels contained not a particle of tungsten, whilst the metal in others was accompanied by arsenic, sulphur, phosphorus, and other impurities noxious to the quality of iron and steel. Tungsten further enters into the composition of other valuable alloys. Tungsten-bronze and an analogous compound of a rich violet colour are prepared by the reduction of melting tungstate of sodium (or potassium) with a further addition of free tungstic acid. Minargant, an alloy much used in America, and said to combine the colour and

lustre of silver with the hardness of steel, is composed of 100 parts copper, 70 nickel, 5 tungsten, and 1 part aluminium. We feel no hesitation in calling the attention of metallurgists to an element which holds out such great promises, nor can we forget that its utilisation on the large scale would be a boon to the miners and mine owners of Cornwall, where it exists in abundance. We have received from M. Biermann specimens of his interesting preparations, and must congratulate him on their quality.—*Chemical News.*

Meetings of Public Companies.

UNITED MEXICAN MINING COMPANY.

The ordinary half-yearly meeting of shareholders was held at the offices of the company, Great Winchester-street Buildings, on Wednesday.—Mr. CHARLES MORRIS in the chair.

Mr. W. H. BROWNE (the secretary) read the notice convening the meeting, and the minutes of the preceding meeting, which were confirmed. The report and accounts were taken as read.

The CHAIRMAN said, before briefly referring to the report, he wished to tell the shareholders that Mr. Furber would have been present at the meeting if the state of his health would have allowed it. Mr. Furber, however, took just as much interest in the mine as he had ever done, and frequently called upon Mr. Browne, and the (the Chairman) was authorised to say that if any shareholder had any question that he would like to ask Mr. Furber on any of the points in the working of the mine explained that gentleman would always be happy to attend to any appointment which might be made. In addressing the shareholders at their meetings he (the Chairman) always felt some degree of difficulty to know what to say to them, for the directors always made their report very full. This being the case he hoped the shareholders would excuse his not making a long speech. The substance of the report was contained in the paragraph, which stated:—

"The directors flatter themselves that though no decisive results can be claimed they are able to meet the proprietors under slightly improved prospects. Tradition (true at times, though generally fallacious) records that the mine of San Cayetano at the end of the last century was worked in good ore with profit to its owners, who were prevented from continuing downwards by the heavy influx of water. What has come to light in the mine points to the confirmation of this tradition. The water is very abundant, and will, after the communication of the pozo de guia, run down to the gallery of Los Angeles, and thence to the great adit, without trouble or expense. Again, the discovery of ore in various parts of the mine, and more so in solid ground in the pozo de guia (the latter having yielded 5½ mule loads of ore, assaying from 200 to 280 ozs. of silver per ton) sufficiently proves that the old mine was really rich. The fact of the vein being entirely taken out from 50 metres depth up close to the surface corroborates this belief, and it is held, with some degree of probability, that the cleaning up of the lower part of the mine (which, however, is an operation unfortunately involving delay and expense) will lay open sections of the lode, both in the San Cayetano and El Diamante ground, which may be remuneratively worked on downwards to the level of Los Angeles, and subsequently to that of the great adit."

He could only call the attention of the shareholders to this, the most important paragraph in the report. It might be asked what reason the directors had for making this statement as to the prospects of the mine. Well, there was a tradition in the country that down to a certain point this mine was developed with a profit by the old workers, and the company had now very nearly reached the point at which they left off their explorations. The present indications were such as to warrant them in believing that they would soon get into ground the working of which would reward them for the courage and outlay that they had expended upon it. That was really the substance of the report, and he did not think he could tell the shareholders more if he talked to them for half-an-hour. Like other mines, this was, of course, a speculation, but he fully believed that they would soon be rewarded for their patience. He would be happy to reply to any questions which shareholders might wish to put, and would move—"That the report and London audited balance sheet as submitted be received and adopted."

Mr. GOLDSMID seconded the motion.

A SHAREHOLDER asked whether the Chairman could inform them a little more definitely than "very nearly the point" how far they were from the point mentioned, and how long it would take them to meet it, because that seemed to be the crucial test?—The CHAIRMAN replied that it would be utterly impossible to say how long they would be in reaching this point, as so much depended on the progress made in the cleaning up of the mine.

The SHAREHOLDER said he referred more to the distance than the time.

The CHAIRMAN had no doubt in two or three months time the shareholders would have a good deal more definite information as to the future prospects, but in the meantime they had good symptoms of ore.

The motion was then put, and carried unanimously.

Mr. STAPLES thought the shareholders would go away rather dissatisfied with the very meagre report which had been presented to them. In this report the directors referred to traditions or certain history handed down as to what the mine had yielded in the way of profits to its previous owners. He thought the shareholders would be very much interested if the Chairman could give them a little more particulars as to this tradition; whether there was any definite history or anything to tell them that any particular family had made a large fortune out of the mine, or, in fact, anything at all which would be of service to this company or interesting to the shareholders to know. (Hear, hear.) He believed they were on the eve of very great successes indeed, which probably the Chairman did not like to speak about, as he could not do so with actual certainty; but that was his opinion after watching the mine for a long series of years. They had more than a few stones of ore, for there were indications of veins which must have been worked at great cost, and have returned a considerable amount of profits to its then owners. Shareholders might not know why it was that the mine had not yielded a profit to the company before this time, but those gentlemen who were conversant with the progress of Mexican mining would know that it was only quite lately that any steam machinery had been employed in Mexico for the purpose of raising water from the mines, the drainage having been effected by the old means of malacates, or horse-whims.

The CHAIRMAN remarked that this company did not use steam to drain the mine.

Mr. STAPLES said he was aware of that, for so far as he knew steam-pumping was only carried on at one mine in Mexico. He did not believe they would require to pump the mine for any length of time, for the deep adit level would keep it drained; but that point had not yet been reached. So far as they had seen the lode was of a porous character, and he believed the ore would continue down nearly to the top of the old tunnel itself. He wished to ask if the Chairman could tell them what was the distance from the present workings to the top of the tunnel, as that would give them an idea of the amount of reserves they were likely to have. He could only regret that Mr. Furber was not well enough to be present at the meeting, as he would, in all probability, have materially enlightened upon the remarks which the Chairman had made.

The CHAIRMAN, in reply, said no one regretted more than himself the absence of Mr. Furber, but he might state the mine had been shut up until the present company commenced operations for a period of nearly 100 years, so that they could not expect to have any very accurate statement as to what it had yielded, more than a general tradition that it was very rich when the old workers were obliged to cease their operations. The appearance of the mine so far as they had gone fully justified them in hoping for very good results. Regarding the draining of the mine, the adit level to which Mr. Staples had referred would do effectually.

A SHAREHOLDER said the old workers were probably drowned out.—The CHAIRMAN had no doubt that was the case.

The SHAREHOLDERS asked, if that were the case, whether it was not strange that with such a valuable source of profit their predecessors should not have made a fight against the water?

Mr. WILLIAMSON (a director) replied that the old workers must have made a very considerable fight to have got to a greater depth than this company, with all the modern appliances of mining, had yet been able to reach. (Hear, hear.) Working a mine was a very different thing a hundred years ago to what it was now.

Mr. STAPLES asked what was about the distance from the bottom of the shaft to the crown of the old tunnel?

The SECRETARY replied that they were now down about 80 metres,

so that it would be about 100 metres to the top of the tunnel. Ore had been taken out to a depth of about 80 metres, but it had generally been found that the ore continued to a depth of 350 metres; they had, therefore, a very large field before them in this district.

The meeting then terminated with a vote of thanks to the Chairman and directors.

WEST GODOLPHIN MINING COMPANY.

The general meeting of shareholders was held at the company's offices, Great St. Helens, on Tuesday.

Mr. ROBERT WILSON in the chair.

Mr. CHARLES THOMAS (the secretary) read the notice convening the meeting and the minutes of the preceding one, which were confirmed. The statement of accounts, showing a debit balance of 473*l.* 10*s.* 10*d.*, was submitted, and the subjoined report of the agent was read:—

The CHAIRMAN was sorry to say that the last five months' working had resulted in a loss. They had cut the lode in the 80, but had not opened upon it as yet. As far as they had yet gone it scarcely paid for stamping, but in the shallower levels they had had to drive a little distance before reaching anything valuable. He hoped that in a few fathoms driving they would have a lode which for 10*f.* of its width was worth 40*l.* per fathom. For the next few months they would probably nearly meet cost, although their loss on the last five months' working was 577*l.* 11*s.* 1*d.*, and the loss on the current month was 236*l.*; that loss, would, however, be somewhat lessened by the copper and tin they had on hand. They had had very little water in the early part of the month, but he hoped now that they had water that they would be able to increase their returns. After paying the cost now coming due they would have but 67*l.* at the bankers, whilst their arrears of call were 695*l.*, which was principally due from members of the committee.

Mr. C. THOMAS remarked that inasmuch as three-fourths of the mine were held by the committee, it necessarily followed that when they had large arrears of call the larger proportion of it would be due from the committee.

Mr. MASKELL enquired whether any shares had been relinquished? The SECRETARY said there had not; five shares had been forfeited some years since, and those still remained in the hands of the company.

The report and accounts were then, upon the proposition of the CHAIRMAN, seconded by Mr. GLADSTONE, received and adopted.

Mr. GLADSTONE enquired whether it would not be well to sell the engine which they were not using—not to force the sale, but by advertising it if necessary. He understood it was a good engine, although it was not powerful enough for them.—The SECRETARY feared that at present no reasonable offer would be obtained for it.

—Mr. GLADSTONE continued that as they had 3 tons of tin in the stone on hand, and had raised 12 tons last month, and might, with improving prospects, expect 14 tons this month, probably a very small call would suffice.

The SECRETARY said that if they raised 17 tons in the month the loss would be 100*l.* per month, so he did not see how they could do with a call of less than 2*s.* per share.

Upon the proposition of the CHAIRMAN, seconded by Mr. MASKELL, a call of 2*s.* per share, payable in 21 days, usual terms, was agreed to.

The CHAIRMAN read a letter from Mr. Waddington, who, he said, had recently purchased a large number of shares in the mine. It stated that Mr. Waddington had recently visited the mine, and made certain suggestions as to the points of working. He (the Chairman) thought Mr. Waddington would be a valuable member of the committee, and would propose his election.

Mr. MASKELL proposed, and Mr. C. THOMAS seconded, that Messrs. Wilson, Boulton, Gladstone, and Waddington be the committee for the ensuing four months.

Mr. MASKELL enquired what was to be done about the forfeited shares, and suggested that as the whole of the committee was present they should state what they intended to do about their arrears.

Mr. GLADSTONE said that for his part he had no intention of investing any more capital in the mine. Capt. Pope was, he fully believed, straightforward and honest, but his judgment had been continually in error. Instead of their position improving they were continually doing the reverse. Capt. Pope stated only in July that he hoped even at the present prices of metal to be able to meet cost, yet as a matter of fact they were now losing 10*l.* per day. At the 60 the lode was less valuable than at the 50; at the 70 it was poorer than at the 60, and at the 80 it would not pay to go to the stamps.

Mr. MASKELL enquired whether it was worth while to go on with the mine?

Mr. GLADSTONE thought that was the question, and he thought some independent agent should inspect the mine. He would suggest Capt. Josiah Thomas, not because he knew anything of him—he had never seen him but once—but because he had inspected it before.

The CHAIRMAN thought it undesirable that any inspection should be made until they had seen more of the lode at the 80, and as there was but one independent shareholder present he would ask him—Mr. Maskell—for his decision.

Mr. MASKELL was inclined to agree with the Chairman.

The meeting then degenerated into a desultory conversation between the gentlemen present, and ultimately closed in the usual manner.

CARON LEAD MINING COMPANY.

The first annual general meeting of shareholders was held at the offices of the company, Change-alley, on Monday.

Mr. W. BOWMAN in the chair.

Mr. HENRY R. MOORE (the secretary) read the notice calling the meeting.

The CHAIRMAN: Gentlemen, I think there is not much for me to say about the directors' report, and the same remark applies to the manager's report. They are simply statements of facts. I ought, perhaps, to apologise to you for the manager's non-attendance here to-day, but it was the judgment of your directors that he would be better employed at your works. We are just about getting our machinery into full work, and his services might be required there at any hour, and, therefore, we thought that the shareholders would dispense with his attendance here to-day. I shall be very glad to answer any questions which any shareholder may wish to put with regard to his report. I think it is very full and very satisfactory.

The mine is opening up quite as well as we could expect. The 10*f.* level, so far as we have seen, is richer than the adit level, and the adit level is improving, and we have no doubt whatever that we shall have a profitable mine. The machinery is now all fixed, and we have taken care to do the work which had been done in a substantial manner. By making a new engine shaft, which we proposed to do from the beginning, we bring out our leadstuff considerably above the dressing-floors, so that in process of dressing the stuff has to come a little down hill. We raise it first of all into what we call the kilns, or ore-shoots, which hold a large amount of stuff; it will from thence pass to the grates, for washing and picking, and then it will go from there to the crushing-mill, which is a little below, so it has not to be raised again. The loading places for the ore are a little elevated above the highway leading from the mine to the station. I may say that the road to the station is a very good one, so that the facilities for delivering the ore will be very good. I was rather hoping to have had a sample here for you to-day, and also an assay of it, but we were unable to get a really true sample, on account of our slimes being behind. Perhaps I should explain more fully that the fine ore which comes out with the refuse in washing requires separating afterwards, and we have not a fair sample of that to mix with the other. It is has to be mixed with the entire heap, and the sample taken from the whole, and if one could be got then we should have had a sample for you. I hope in a very few days we shall not only sample but also sell a considerable parcel. I have a letter from our manager, accompanying a sample of the first crushing which he sent up, but as it is not a fair sample I think it is not right to say anything further about it. The balance-sheet very much explains itself, but I shall be happy to answer any questions respecting it. In conclusion, the Chairman moved the adoption of the directors' and manager's reports,

and the statement of accounts.—Mr. BEDFORD seconded the resolution.

A SHAREHOLDER: What quantity of ore do you expect to sell as a first sampling?—The CHAIRMAN: We suppose that, at the first sale, we shall have 30 or 40 tons. We do not at present propose to sell such a large amount every month, unless it is the wish of the shareholders. Our idea is rather to limit our sales during the present dull times. We have opened up more ore ground, and we can set more stopes any day.

A SHAREHOLDER: What is your opinion about the price you are likely to get?—The CHAIRMAN: That is what I am entirely lost in. I believe the ore contains an appreciable amount of silver, and, therefore, I have been anxious for the last fortnight to get a proper sample, because a small percentage of silver may raise our price.

A SHAREHOLDER asked whether the discoveries in the 10*f.* level confirmed the hope of a continuous run of ore?—The CHAIRMAN said the course was not quite continuous. It was better in the 10 than in the adit level, and more uniform and bunched as they got westward. In the 10*f.* level, and especially near the engine-shaft, they had had more ore than in any other part. It was there getting below the depth of the hill. He also believed the eastern portion would be very good.

The SHAREHOLDER: You are laying out in reserves more than you take away?—The CHAIRMAN: Yes; we are not taking away half the ore we could. We could take twice the ore we are doing.

The SHAREHOLDER: How many stopes have you at work?

The CHAIRMAN: Three, but one is a sort of development stope in the east, and that has proved better than we anticipated.

The SHAREHOLDER: What is the average value of the stopes?

The CHAIRMAN: About 10 or 12*cwt.* per fathom. We shall take down the poorer with the richer—perhaps, leavesome of the richer. We have started a stope in the east, partly as a development, and it is turning out good ore.

The CHAIRMAN, in answer to a further question, said the run of ore was almost continuous for about 40*fms.* Some parts were poor, and some richer, but the lode was uniformly productive so far as it had been opened. There was very little ground which would not pay for taking down.

A SHAREHOLDER: Do you call it a masterly lode?—The CHAIRMAN: Yes; it is very like the No. 3 lode in Grogwinion. The stratification is very much the same, and the indications similar. Indeed, you could not tell the heaps of orestuff at Caron from the Grogwinion orestuff.

The CHAIRMAN, in answer to a further question, said he hoped and anticipated that there would be an increase in the price of lead in the coming year.

The resolution for the adoption of the report and accounts was then put and carried.

On the motion of the CHAIRMAN, seconded by Mr. W. BROOKES, a resolution was passed authorising the calling up of the remainder of the capital.

The CHAIRMAN, in reply to Mr. ROSS, said this would make all the shares level, and all would be equally entitled to participate in the dividend which the directors hoped shortly to pay.

On the motion of Mr. ROSS, seconded by Mr. JOHN W. OWEN, Mr. Richard Ainley was re-elected the auditor.

A cordial vote of thanks was then passed to the Chairman and directors, and the meeting broke up.

NORTH HENDRE LEAD MINING COMPANY.

The eighth annual ordinary general meeting of shareholders was held at the company's office, Westminster Buildings, Chester, on Monday.

Mr. HENRY R. BOWERS in the chair.

The SECRETARY read the notice convening the meeting, and the minutes of the last annual meeting and an extraordinary general meeting, both held on Jan. 25, were read and confirmed.

The annual reports and accounts having been sent to each shareholder were taken as read.

The CHAIRMAN, in moving their adoption, said that he was glad to meet the shareholders under such very favourable circumstances. He believed the mine had never before looked so well, and the company had never been so financially successful as last year, having made a clear profit of upwards of 12,000*l.*, and this would have been much larger but for the low price of lead during the year. The quantity of ore sold had been 1808 tons, and if the average price had been 2*l.* a ton more they would have been able to pay 12*l.* in addition to the 40*l.* per cent. now earned; the meeting would, therefore, agree with him that there was no reason to complain of the output or management.

The engine and machinery having to be thoroughly repaired, the work of lead raising was partially stopped for nearly two months; if that had not been the case 200 tons more might have been raised during the year. He had been down the mine on Friday last, and Messrs. Brantley and Rowland on Saturday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

With regard to the purchase of the East Hendre set, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had been down the mine on Friday last, and he had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of north the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendre Mill property had been paid off, and the directors had procured a first mortgage of 5000*l.* at 4 per cent. interest, leaving a balance of 7750*l.* 10*s.* 9*d.* due to the company. As they had to borrow about 3000*l.* of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4250*l.* and the 7750*l.* advanced on mortgage, and so set free the balance on revenue account.

be apportioned as follows:—480*l.* for the dividend; 688*l.* 12*s.* 6*d.*, total amount of the debit balance; and 267*l.* 6*s.* 9*d.* carried to credit of next account. The following report was read to the meeting:—

Great Lode: The engine-shaft, sinking below the 180, is down 18*fms.* We have finished cutting the bottom pit, and are now putting in the skip-road from the shaft to the 190; we shall fix a lift at the 190, and commence to sink as soon as possible. In the sump winze shaft we have fixed a lift at the 190, and are now sinking the shaft, which is down 3*fms.* below the 190, and is worth for tin 15*l.* per *f.* The 190 is driven east from sump winze shaft 28*fms.*, and is worth for tin 15*l.* per *f.* The 190 is driven west from sump winze shaft 21*fms.*, and is worth about 8*l.* per *f.* In the 180 we have five stopes working, two east and three west, worth on an average for tin 14*l.* per *f.* each stope. The winze in the bottom of this level is communicated with the 190; we are now stopping east and west of this winze. The 170, driving east on the south part of the great lode, is worth for tin 8*l.* per *f.*; at this level we have a cross-cut driving south from the great lode, which is driven about 24*fms.*; in this we hope soon to cut the flat lode. The stope in bottom of the 160, on the eastern ground, is worth for tin 9*l.* per *f.*

Engine Lode: The 170, west from engine-shaft, driving south on the cross-course, is now sunk 10*fms.*; here we think we have intersected the south lode, but shall know more about it in a few days.

Flat Lode: At the 150 we have three stopes working, worth on an average for tin 15*l.* per *f.* each stope. The 160 is driven east from cross-cut about 51*fms.*, and is worth for tin and copper 10*l.* per *f.* In the 150, east from west cross-course, we have two stopes working east and west of Woolcock's winze, worth for tin and copper 12*l.* per *f.* each stope. In the 150, west from eastern cross-course, we have two stopes working—one in back and one in bottom, worth for tin and copper 9*l.* per *f.* The 140, west from the eastern cross-course, is driven west from F. Reddinick's winze about 9*fms.*, and is worth for tin and copper 13*l.* per *f.* We have one stope in the back of this level worth for tin and copper 12*l.* per *f.*

Western Shaft: We have secured and cut down this shaft to about 20*fms.* below the 180, about 40*fms.* from surface, and have also put in the ladder road from surface to the 180. We have eight tribute shafts working at tributes varying from 10*s.* to 13*s.* 4*d.* in *l.* on tin and copper.—JOHN MAYNARD, Manager; C. Bishop, W. Tippet, Agents.

WEST PATELEY BRIDGE LEAD MINES.

The report of the directors, to be submitted at the meeting on Tuesday, states:—

The expenditure during the year embraced in the accounts amounted to the sum of 3528*l.* 15*s.* 10*d.*, for which a large amount of dead work has been done—a Robey's patent steam-engine erected, with drums and machinery, for working both the No. 2 and Craven Cross shafts, a crusher and dressing floors erected, tramways constructed, and other surface operations completed on a scale equal to the treatment of a large quantity of lead. The large amount of sinking and underground work done during the year is fully explained by the manager's report of June 18 and that now submitted; the latter so clearly sets the present position and prospects of the undertaking that the directors feel it unnecessary to supplement it by any remarks of their own. The unexpended capital amounts to a total of 9118*l.* 15*s.* available for future operations. The directors retiring at this meeting are Col. J. A. Todd and Mr. H. A. Hammond, who, being eligible, offer themselves for re-election.

The manager's report (Mr. David Williams, M.E.) is as follows:—Craven Cross Shaft: The north shaft is sunk, cased, and divided, and a substantial ladder road put in to a depth of 52*fms.* below surface, and communicated with the top level, and will be carried down to the same depth as the 56; before reaching that point the main part of the vein will underlie into the shaft, and judging from the large quantities of ore raised from the workings above, and the character of the vein at this depth, our prospects here are most flattering.

56*fms.* Level: This level is extended west upon Craven Cross vein 128*fms.*, and is now within 26*fms.* of being under the perpendicular of the shaft. The vein in the present end is very promising, being over 4*fms.* wide, composed of spar, barytes, and branches of galena of good quality, the richest ore going down in the scales of the level; this level is being pushed forward with all dispatch to communicate with the shaft, after which we shall cross-cut north and south to the parallel veins. Those on the north being in entirely whole ground have all proved rich in the adjoining mine, whereas those on the south have produced more or less ore in this shaft. From a small shaft upon Longthorn's vein a few miners raised about 12,000*l.* worth of ore in a very short time. At a point 48*fms.* east of Craven Cross shaft we have sunk a winze for a 63*fms.* level; the latter is extended west upon the vein 12*fms.* The vein in the present end is over 18*fms.* wide, and worth for lead 5*cwt.* per fathom; a stope in back of same level in a vein 4*fms.* wide, producing 15*cwt.* of ore per fathom.

No. 2 Shaft: The 20, east of shaft, has been extended 61*fms.* 3*fms.* upon the vein; the latter is 3*fms.* wide; its component parts consist of spar, barytes, and intermixed with branches and patches of lead ore. A stope in back of level is worth 10*cwt.* of ore per fathom. The 20 shaft, to a depth of 9*fms.* from surface, is extended 15*fms.*; the vein here is daily improving, at present 3*fms.* wide, and worth for lead 10*cwt.* per *f.* The 28, west of shaft, is extended 14*fms.* 5*fms.*; the vein is disordered and heaved north by a north and south vein; we have commenced cross-cutting south upon the latter to intersect four parallel veins—1, being a branch worked upon in the 20, east of shaft; 2, will be reached in about 12*fms.*, is Longthorn's vein, and has been extensively worked close to surface; 3, is new discovery vein, in about 30*fms.*, worked to a depth of 13*fms.* below surface; a very promising vein, and produced ore in paying quantities; 4, Golden Fleecy vein, worked from No. 1 shaft, to a depth of 9*fms.* from surface, and proved rich, which are of an east and west and other north-west and east bearings, thus forming a series of junctions and intersections, such invariably resulting in rich and profitable deposits of ore. Our prospects here are most encouraging, and looking at the various points of value now in operation, I have every confidence of being able to materially increase returns of ore for the ensuing year.

[For remainder of Meetings see to-day's Journal.]

Registration of New Companies.

The following joint-stock companies have been duly registered:—

THE STREDEA MINING COMPANY (Limited).—Capital 12,000*l.*, in shares of 1*l.*. The acquiring, by purchase or otherwise, of a lease granted by the Crown of all mines, veins, and beds of

Aug. 23: The big black stone in the bottom of the tunnel level is fully as good as when last spoken of, but not so rich as some weeks since. The end driving north from the winze, in the 15, maintains its value of 16 tons per fathom.

Aug. 30: Our operations at Clomes' cross-cut have not been so satisfactory as we had hoped. The quartz we come in contact with must either be a big rock or some deranged part of the lode. Had the cross-cut been further south it is probable the lode would have been found in a more settled state. In that case it would have been away from the bend and the broken state of the lode. This large quartz lode should be fairly and faithfully explored, as it may become the salvation of the mine. In our general report the merits of this lode will be fully set forth.

Sept. 6: The lode in the end south of this place appears to be better defined than when last reported on; it consists of a hard, poor-looking quartz. Any change must be for the better.

Sept. 13: In the level driving south of Clomes' cross-cut the lode is 5 ft. wide, compact, and well defined, consisting of hard quartz and spots of black ore. There is a little water coming out of the lode.

Sept. 20: The level driving south on this lode does not improve; it is less defined than it was, and mixed with country rock. If no change takes place shortly in driving on the course of the lode south of Clomes' cross-cut we intend to clear at surface down to the old workers' bottom; this lode being for a considerable distance in whole ground, and a great height above the tunnel level, would be of immense importance if ore ground in paying quantities could be found; still we can but admit that our prospect in the present end is anything but favourable. Should any change take place it must be for the better.

Sept. 26: No improvement has taken place at this point.

CHAZ VERDE.—Aug. 22: No change has taken place worthy of notice; it is yielding as usual, a little green ore. We intend to put on an increase of force at this point in the course of a few days, in order to ascertain whether the ore goes into the old workings or otherwise.

Aug. 30: Here we are driving an end and stoping the back; the end has become poorer, but a change for the better has taken place in the stoping. This pitch being so near surface and the old workings, but little dependance can be placed on its durability.

Sept. 6: The end has fallen off in value, but the back is productive of good ore; this is now set on tribute.

Sept. 13: There is no change to speak of.

Sept. 20: A fair quantity of green ore is being broken from this point. The end driving north towards Dios Padre is very poor, and will not pay the expense of driving. We shall begin some little exploratory work here shortly.

Sept. 27: The stoping in the back yields a fair quantity of green ore. The end going north has a little more ore than when last reported on; our being so shallow and near the old workings does not lead us to hope for great things here so near the surface.

J. H. Clomes, Aug. 30: Underground: The expense we are now incurring in the Mina Grande will not permit of our doing anything at present in the bottom of the Tiritio. To keep the furnace supplied with black ore the present expenditure in the Mina Grande will increase rather than diminish. The operations going on in that mine are the stoping between the tunnel and the 12 and the communication from the 12 to the 15; the ground is hard and expensive to work. From the latter place water has to be drawn by hand. The ley of the ores from this mine is slightly higher than usual.

YETA DE LAS GUJAS.—Clomes' Cross-Cut: A resolute attempt to see this fine lode at tunnel level should be made.

Sept. 13: ASSAYS: Sample from incline winze below the 12, Mina Grande, general sample from 35 ton of spalled best work—89.94 ozs.; in consequence of this sample I to-day telegraph you—"Ley in Mina Grande bottom improved." Sample (fresh one) of buddle head from Mina Grande burrows (repeated)—45.41 ozs.; this sample is important, but until more is stamped from these burrows I do not feel safe in telegraphing.

Sept. 20: We find that the ley in the Mina Grande has improved. We last week sent you the result of a good general sample in the 12 winze, and are now preparing another from the 15 (from previous samples that I have had from the latter this may, I think, be called 36 rock). I had always looked upon these ores on account of their leadiness as, like the other Mina Grande ores, poor.

Sept. 27: ASSAYS: General sample from pile of spalled ore workings in the 15, Mina Grande, 133.44 ozs.; small for furnace, from Mina Grande dump, 29.84 ozs.; ditto, 26.95 ozs. Mina Grande spalled ores of ley 0.4575 per cent. is something new here, and still further justifies my telegram of the other day. These are not assays of picked stones, but general samples taken by Capt. Morcom. I have ordered the separation of the solid ore from this place for export.

Cross-Cut to Las Gujias, or Clomes' Cross-cut: This lode is not at all well defined, and if at the end of next week the end does not look more inviting I shall follow Capt. Morcom's advice, and begin to sink at surface. Explorations in the Tiritio bottom will be begun as soon as possible.

Telegram from Mr. Clomes—Loss for September, \$1500.

ON FORCE PUMPS WITH TUBULAR RODS.*

The author describes various arrangements of pumps for mining purposes, in which the delivery-pipe, or a portion of it, is used as a pump-rod, and he discusses and compares their merits and demerits from a theoretical and practical point of view. He states the formulae for determining the principal dimensions, weight, &c., for various constructions. Preference is given to Rittinger's pump, as being the cheapest, most economical in working, and taking up the least room in the shaft. In Rittinger's pump the lower end of the delivery-pipe acts as the plunger, in the interior of which the delivery valve is placed; the uppermost portion, from which the overflow takes place, is rigid, and fits into a stuffing-box at the end of the movable part forming the pump-rod. Another modification is also described by the author. The firm of Hoppe, in Berlin, has for many years made pumps of the above description, from 1000-horse power downwards, for various mines in Germany, some of which are named by the author. For driving these pumps compound rotative engines with fly-wheels are considered the best, Cornish engines having been found to be unsuitable. According to Hoppe's experience, this kind of pump does not work advantageously when the quantity of water to be raised amounts to less than the fourth part of that for which it is designed.

* By Prof. H. UNDEUTSCH: Civilingenieur.

* From JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

PREVENTING INCORUSTATION OF BOILERS.—The improvements invented by Mr. F. JANSSENS, of Herten, Holland, consists in the manufacture and use of a material which the inventor calls "alcalised cellulose," and which is made in a fluid as well as in a solid state by boiling by steam suitable fibrous materials or their derivatives with lye of soda, to which in some cases oxalic acid may be added. A certain quantity of the "alcalised cellulose," say half a pint per week and per HP, fed in the boiler with the feed water will be sufficient to keep the boiler clean of incrustation and free from corrosion. The composition acts thus:—The matters forming incrustation are precipitated in form of a fine powder or mud, and gather at the bottom of the boiler, whence they can be let out or withdrawn after some time of rest through the waste cock; but as the accumulation of sediment in the boiler with very hard and impure feed water would be very great, and this, as well as the clearing it out from the boiler, would be connected with much trouble and other drawbacks, he employs a special apparatus for the automatic removal from the boiler of the injurious matters which have been precipitated by the use of the alcalised cellulose, and he claims that in combining the two he radically prevents the formation of incrustation in steam-boilers.

NEW WATER MOTOR ENGINE.—In connection with engines whose motive power is produced by the pressure of a fluid such as water, steam, or air, Mr. F. W. TURNER, of St. Albans, has invented some improvements, which include various novel features of construction. According to one part of his invention he constructs an engine which is chiefly designed to utilise the force of a head of water. This engine is provided with an oscillating cylinder containing a piston, the rod of which is coupled to and actuates a crank shaft. A fly wheel is necessary where a single cylinder is used. One important feature of this part of the said invention is the arrangement of the centre of oscillation of the trunnions at or near the upper or crank end of the cylinder instead of in the centre of the cylinder's length, as heretofore, in such engines. Another feature of this part of the invention is the peculiar construction of the trunnion through which the fluid is admitted to and exhausted from the said cylinder. The trunnion is made in the form of a conical socket, which is fitted and works to and fro in a hollow conical or taper plug, secured in any suitable manner to the framing, and which forms the valve for regulating the admission and exhaust of the fluid to and from the cylinder. Through the shell of this conical part or plug he forms two ports or apertures (when the cylinder is vertical) at the upper side, and two at the lower side of the same leading into two separate compartments formed in the said conical plug. These compartments are separated from each other by a partition or diaphragm extending throughout the length of the said plug. One compartment and port form the admission passage and the other the exhaust passage for the fluid. Instead of being at the top and bottom it is obvious that these ports may be otherwise arranged, but the admission and exhaust ports must in all cases be separated from each other. In the face of the cylinder trunnion at the parts which work over these ports or apertures he provides other apertures or ports leading to the two ends of the cylinder, and by the oscillation of the said cylinder these ports in the trunnion are moved to and fro over the said admission and exhaust ports, and the partition or diaphragm in the

conical plug, thereby alternately admitting and exhausting the fluid at both ends of the cylinder. The motor above described can also be worked by steam or compressed air. Outside of the said trunnion the plug or trunnion bearing has a cylindrical portion, which passes through a gland packed with asbestos, or other suitable material. Between this gland and the aforesaid ports Mr. Turner turns in and around the interior of the trunnion a small groove or channel, from which longitudinal grooves extend into a space left for clearance at the inner end of the said plug or valve, and he forms a small hole through the end of the valve plug on the exhaust side of the said diaphragm, reaching into the exhaust compartment, the object being to provide means for the escape into the exhaust passages of any water that may leak past the valve. The other trunnion of the cylinder in the improved engine works on a plain cylindrical journal or bearing, which is supported on the engine framing, and is made adjustable endwise. By means of this adjustable bearing the conical trunnion of the said cylinder may be forced more or less tightly upon its conical valve or plug, and the wear or slack of these parts may thus be compensated or taken up.

CONVERSION OF NON-CHILLING IRON INTO CHILLING IRON.

An improved method of converting non-chilling into chilling irons has been invented by Mr. S. A. FORD, of Allegheny, Pennsylvania, and consists in submitting a charge of melted non-chilling iron to the action of an air-blast for a few minutes only (say, from one to six minutes), the air-blast being cut off either just before or just after the appearance of the carbon flame, according to the depth of chill required in the product. In the manufacture of pig metal two processes are commonly followed in the blast-furnace, the one known as the cold-blast and the other as the hot-blast process, and the products are known in the trade as hot-blast iron and cold-blast iron. The cold-blast iron is low in silicon, and is especially adapted for chill castings, but its production is limited by the nature of the ore required and the small size of the furnaces it is practicable to work to advantage. The hot-blast iron, on the contrary, can be produced in any quantities desired, as there is practically no limitation either in quality of ore or of size of furnace; but the hot-blast iron is high in silicon, and though well adapted for the Bessemer process is a non-chilling iron, totally unfit for the manufacture of chill castings.

The best chilling cold-blast irons will average 0.7 per cent. of silicon and about 4 or 5 per cent. of carbon, and the average yield of a furnace worked by the cold-blast will be from 8 to 12 tons of metal per day, but the hot-blast furnaces may be constructed to yield 80 or 100 tons per day. The cost of cold-blast charcoal chilling iron will run at the present time \$35 to \$40 per ton, while the hot-blast non-chilling iron can be procured at from \$17 to \$20 per ton. The main object of the present invention is to utilise the comparatively cheap hot-blast iron in the manufacture of chill rolls, car wheels, chill ploughs, malleable castings, and under all similar circumstances where the more expensive cold-blast charcoal chilling irons are now necessarily used, but the process is equally applicable to the treatment of light chilling irons where it is desirable to increase the depth of the chill. Having melted the desired quantity of pig-iron in a cupola or other suitable furnace, or, if convenient, taking such a charge of molten iron directly from the blast-furnace, he introduces it into a furnace where it can be treated by an air blast. For this purpose he prefers a Bessemer converter, wherein he submits the molten metal to the action of the air blast for a few moments, shutting off the blast either just before or just after the appearance of the carbon flame, varying the time slightly, according to the quality of the metal and the depth of chill required.

If only a small amount of chill is required he cuts off the blast just before the carbon of the metal begins to oxidise, which point can be determined by the increased strength of the flame with absence of the brilliant yellow colour. When a deep chill is desired the blow is continued until the brilliant yellow due to the oxidation of the carbon appears in the flame, but it is cut off before the disappearance of the silicon flame, or that flame which is seen at the commencement of the blow. The blow having been carried to the extent indicated according to the desired chill, is then cut off, and the metal poured into a ladle or other suitable vessel, and then directly into chill moulds or into sand moulds for the formation of castings, or pigs, which can be subsequently remelted into a cupola or other suitable furnace for the manufacture of chill castings. The whole process will usually occupy from one to five minutes, but

under some circumstances it may be necessary to continue the blow somewhat longer, especially if the hot-blast iron composing the charge be extremely high in silicon. The metal thus treated has not lost the qualities of cast-iron, but will be found to have acquired the qualities of the "cold blast charcoal" chilling irons. It will be found to be very hard, of great strength, and if cast in a chill mould will, when broken, show long white crystals tapering into grey metal. When cast in sand moulds, if the chilling property be not too great, it will exhibit a dark grey colour and close grain resembling cold-blast charcoal iron, but if the chilling property be very high then the edges of the casting will be slightly chilled and the centre of the piece of light grey colour.

UTILISING TIN-PLATE SCRAP.—Great difficulty has hitherto been experienced in removing the covering metal from tin and terns plates, and the consequence has been that large mounds of scrap have accumulated in localities where the tin-plate manufacture is carried on. The chief object of the invention of Mr. HENRY EDMUNDS, jun., of Gracechurch-street, is to remove the coating of tin and terns plates in a rapid and economical manner, and thereby not only to recover the more valuable metal, but also to bring the scrap iron into a state fit for working up again into plates. To this end he fuses the coating metal, and by centrifugal action removes the same from the iron. In carrying out the process he employs centrifugal apparatus so arranged as to admit of the scrap being readily placed therein and withdrawn therefrom, and of receiving a central fire for heating the scrap. The rotating cylinder or drum of this apparatus is fitted with a cage, which is packed with the scrap intended to be utilised, and in the centre of this cylinder and of the inserted cage is a fuel chamber for containing burning charcoal or its equivalent. When the cylinder is charged and the fuel ignited a rapid rotary motion is applied to the cylinder and its contents, and an draught of air to the ignited fuel is thus produced and maintained. The heat thereby generated is caused to impinge upon the scrap, and raise the temperature of the mass to a sufficient height to fuse the coating metal. The effect of the centrifugal action is to discharge the fused metal in the form of spray into the casing of the apparatus, and to leave the iron in a clean state. The cage containing the scrap is then to be removed and replaced by another charged with fresh scrap, and the operation may then be repeated. Instead of using a central charcoal fire the heat may be supplied from an adjacent stove. This will permit of the temperature being nicely adjusted to suit the work in hand, and thereby to prevent the volatilisation of the metal, as, for example, when zinc is required to be recovered, or otherwise injuring the substance under treatment.

SAFETY POWDER FOR USE IN FIERY COAL MINES.—A new powder which may be advantageously used in fiery coal mines as a substitute for gunpowder and other explosive agents now employed for blasting has been invented by Messrs. HUGHES and JONES, of Llangollen. They propose to use unslaked lime compressed into cartridges, or unslaked lime used loosely and well tamped down in the hole, using water or other liquid or liquefaction to saturate the lime. The advantages to be derived from the use of the powder are economy in the production of coal; making less slack than by using the ordinary blasting gunpowder; lives of colliers are less in danger, as by the use of the ordinary blasting gunpowder there is a flash of fire which often comes in contact and ignites the explosive gas in fiery mines; also breaking coal in the back is a special characteristic, as by the use of ordinary blasting powder its force in going out shatters the coal, and therefore much slack is made. The cartridge or the loose unslaked lime is placed in the hole, using water or other liquid or liquefaction to saturate it, and well tamped down with any substance to confine the expansion of the lime and the gas arising from it. It will not, like gunpowder, foul the air, nor does it create smoke, but rather tends to improve the quality of the atmosphere.

CONSUMPTION AND ASTHMA in all stages are instantly relieved by DR. LOCOCK'S PULMONIC WAFERS, which taste pleasantly, and effect a rapid cure. In Bronchitis, Coughs, Colds, Whooping Cough, Phlegm, and all Disorders of the Breath, Throat, and Lungs, "they act like a charm." Price 1s. 14d. and 2s. 9d. per box.

HOLLOWAY'S OINTMENT AND PILLS.—Nervous debility often occurs at this season of the year in persons otherwise healthy, but who having overtaxed mind and body in some one of the many ways so common nowadays, suffer in consequence from an irritability of the whole nervous system, characterised more especially by sleeplessness, tremors, palpitation of the heart, and a general feeling of shakiness and sense of unstrung fibre more distressing even than the actual pain. The muscular and vital energies in these cases seem almost as if they were utterly relaxed, and mental dependency sufficient to alarm anxious relatives and friends often accompanies this condition; no time should be lost, but immediate recourse had to these powerfully tonic and restorative remedies.

MINING MACHINERY.

Schram's Patent Direct-acting Rock Drill, & Improved Direct-acting Air Compressor.

IMPROVED SUPPORTS FOR DRIVING, SINKING, ETC.

CONTRACTS TAKEN. MACHINES LET ON HIRE.

SCHRAM AND OLIVER'S PATENT COAL CUTTER.

RICHARD SCHRAM AND CO.,

CONSULTING ENGINEERS,

9, NORTHUMBERLAND STREET, CHANCERY CROSS, LONDON, W.C.

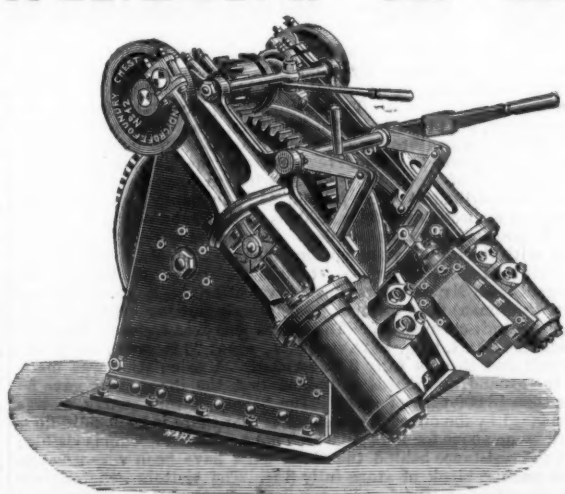
Messrs. OLIVER and CO., Limited,

SOLE MANUFACTURERS,

BROAD OAKS IRON WORKS, CHESTERFIELD.

Also the best WINDING and HAULING ENGINES, BOILERS, PUMPS, &c., &c. GUINAL VENTILATING FANS, AIR RECEIVERS, WAGONS, PIT-HEAD STOCKS, SCHRAM'S STONE-CUTTING MACHINE, and every description of COLLIERIES and MINING PLANT and CASTINGS. Illustrated Catalogues and Price Lists, and references to places where the machinery may be seen in operation, on application. The Rock Drill may be seen at 9, Northumberland-street, as well as at Chesterfield.

IMPROVED PORTABLE UNDERGROUND WINDING OR HAULING ENGINES



FOR MINES AND COLLIERIES,

DESIGNED FOR WORKING WITH COMPRESSED

AIR, STEAM, OR WATER PRESSURE.

Specially designed to take up the least possible space.

BEST MAKE, STRONG, SIMPLE, AND CHEAP.

All made with two cylinders, to any size.

Single or double drum, as required.

Photographs and Estimates on application.

THE SANDYCROFT FOUNDRY
And Engine Works Company

(LIMITED),

NEAR CHESTER

(Late the Mold Foundry Company. Established 1838).

Makers of all kinds of Mining Machinery.

London Agents: Messrs. JOHN TAYLOR AND SONS, 6, QUEEN STREET PLACE, SOUTHWARK BRIDGE, E.C.

ORMEROD, GRIERSON, AND CO.

ST. GEORGE'S IRONWORKS, MANCHESTER,

Engineers, Millwrights, & Boiler Makers,

MANUFACTURERS OF

Stationary Steam Engines and Boilers for all purposes, Mill Gearing, Sugar Machinery, Cranes, Turn-Tables, and Railway Fixed Plant of all descriptions; also, the Diamond Rock Boring Company's Plant—viz.: Compressed Air and Air-Compressing Engines, Prospecting Machines, Tunnelling Machines, and Shaft Sinking Machines.

HYDRAULIC PRESSES OF VARIOUS KINDS

Have the Largest Assortment in the Trade of

PATTERNS,

WITH MACHINE-CUT TEETH, OF

SPUR WHEELS, BEVEL WHEELS.

MITRE WHEELS,

ALSO

FLY WHEELS.

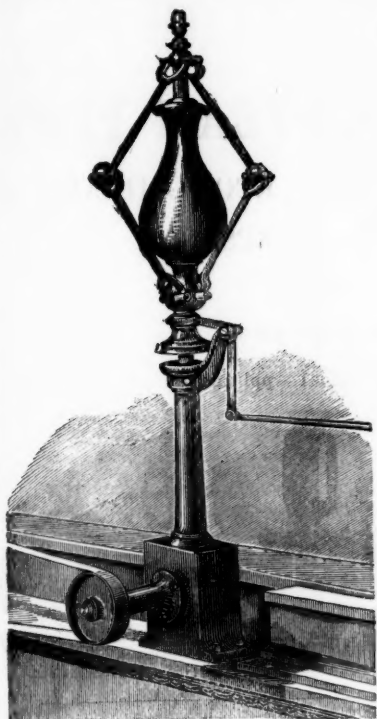
DRIVING PULLIES & DRUMS,

CAN BE SUPPLIED BORED AND TURNED IF REQUIRED.

CATALOGUES ON APPLICATION.

LONDON OFFICES:

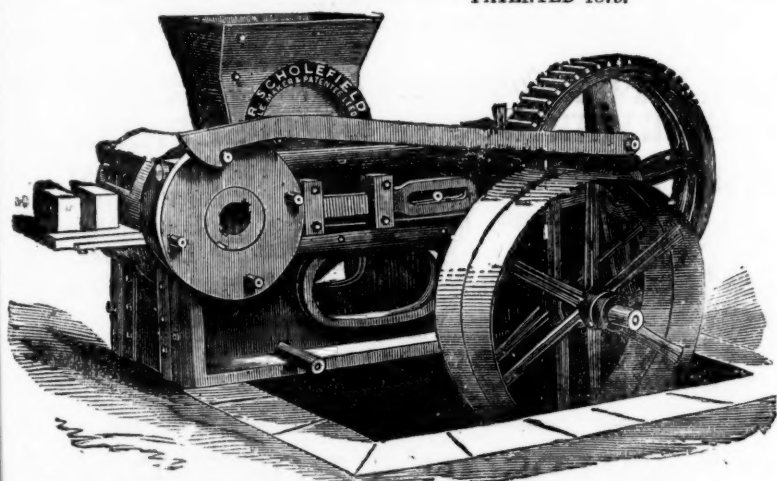
No. 5, WESTMINSTER CHAMBERS,
VICTORIA STREET,
WESTMINSTER, S.W.



Porter's Governor for Stationary Engines. Also Governor on the same principle adapted for Marine Engines.

R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1875.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless) is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of

production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	8 0
1 man grinding, 4s. 6d. per day	4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	2 0
1 boy greasing, 1s. 6d. per day	1 6
1 engine-man, 6s. per day	5 0
1 man wheeling bricks from machine to kiln, 4s. per day	4 0

Total cost of making 10,000 pressed bricks ... £21 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging. As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.
SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS
KIRKSTAL ROAD, LEEDS.

TO LAND OWNERS, MINE OWNERS, HIGHWAY BOARDS, CONTRACTORS, MANURE MANUFACTURERS, FARMERS, AND OTHERS.
THE DUNSTON ENGINE WORKS COMPANY,
GATESHEAD-ON-TYNE,
ARE THE SOLE MANUFACTURERS OF
Archer's New Patent Stone Breaker,

As supplied to the Right Hon. the Earl of Derby, Sir W. G. Armstrong, &c., &c., which is most efficient in operation, and makes the best Road Metal.

ARCHER'S NEW PATENT ORE CRUSHER,

Combines strength and efficiency with moderate cost, and supersedes all other modes of crushing ores.

Archer's New Patent Bone Crusher,

Which is by far the best machine yet brought out, and crushes greasy or dry bones with equal ease. It has dealt in a most successful way with solidified guano.

Long experience has enabled the Dunston Engine Works Company to bring their machines to great perfection.

Price lists and particulars, with illustrations, sent on application to Mr. THOMAS ARCHER, Jun., Manager, at the works; or to Mr. THOMAS BRANDRETH GIBBS, 122, Dunster House, Mark-lane, London.

N.B.—The above company are not exhibiting any of their machines at Paris.

AGENTS WANTED to represent the Company in CORNWALL, SOMERSET, and DEVON, also in WALES; apply to the Manager, by letter only.

DIRECT-ACTING STEAM PUMPS.

The valve chest is, according to the invention of Mr. JOHN SLEE, of Earlestown, Lancashire, cast with the cylinder, and it is bored out to receive a cylindrical valve, in the centre of which there is another cylindrical valve which is actuated by a spindle passing through a stuffing box in the valve chest, which spindle is connected by a rod with a lever having its fulcrum upon any convenient part from the bed, which lever is connected with the piston rod, so that the small central cylindrical valve moves with the piston, but to a much smaller extent. There is a port in the large cylindrical valve which keeps the central valve constantly supplied with steam, and there are ports in the small central valve which admit and cut off steam to ports in the large cylindrical valve which admit steam to the piston. There are ports in the large valve to open and close exhaust ports of the usual arrangement in the cylinder, and there are two ports in the large valve which are opened and closed by the small valve to admit steam to the ends of the large valve, and there is a small port at each end of the valve chest which communicates with the steam port for the piston.

In the cylinder the ports for steam and exhaust are separate and distinct, and when the piston has travelled nearly to the end of its stroke, that side of the piston which has the steam acting upon it uncovers the exhaust port and the steam escapes through the exhaust valve, and at the same moment the steam is exhausted through the passage for steam (which is at that time closed by the large valve), and this allows the steam at the opposite end of the large valve to move it over, at which time steam is admitted to the opposite side of the piston, the central valve having moved sufficiently to bring its ports in the position to do this, and so on for each stroke.

The barrel for the pump, whether for water or air, is made with a small passage or port at each end, the distance between the ports being equal to the thickness of the piston, so that when the piston for the pump arrives at or near the end of its stroke at either end, the small quantity of fluid in front of the piston may pass along the said passage to the back of the piston, and thus relieve the steam piston of pressure and gradually allow the pump clack valve to close.

PROPAGATION OF WAVE MOTION.

It is very largely suspected that many of the views concerning waves and wave motions now generally accepted as orthodox will have hereafter to be considerably modified, since careful experiment and research certainly do not bear out the conclusions which the more prominent members of the scientific world of the past generation, if not of the present, have arrived at. For some years past Mr. ALFRED TYLOR, F.R.S., has given special attention to the question of the propagation of motion in waves and tides, and his enquiries and experiments have now been carried far enough to permit of an intelligible outline of them being given. The leading objects of Mr. Tylor's researches have been to ascertain the mode in which undulations are propagated in water, and the bearing of the results obtained on the accepted theory of tidal waves and phenomena connected with them. The matter has been before the scientific world for nearly a year in consequence of Mr. Tylor's communication to the K.K. Geographische Gesellschaft of Vienna, and is deserving of being at once popularised.

It appears that in conducting his experiments Mr. Tylor employed a specially constructed apparatus, consisting of a circuit of 24 feet of 10-in. glass pipe, laid horizontally, and provided with a box, in which waves could be generated by a head of water of about 1 foot. Mr. Tylor found that a wave traversed the whole circuit under ordinary atmospheric pressure in 4.475 seconds, but that its velocity was so far diminished as to require 4.925 seconds to make its second circuit, which is equivalent to a loss of 9 per cent. of its velocity. A wave caused by the same head of water in the generating box, but moving in a partial vacuum (18 inches), took 4.76 seconds to complete its first circuit, and showed no calculable loss of velocity in making its second circuit. Mr. Tylor concludes from these results "that the velocity of a wave is dependent on the quantity of air which it has to move, and that a wave can only propagate itself until it has displaced its own weight of air," leaving out of account the loss of power due to friction and other obstructions. Upon this basis Mr. Tylor has constructed a formula which gives the limit of possible propagation of any given wave, and he shows that it is only when the number of undulations is equivalent to the weight of the wave that such wave will come to absolute rest. According to Mr. Tylor's formula, the limit of a wave of 240 ft. long, by 30 ft. deep, would be reached, at a distance of 208 miles, and this without taking into account any friction, but only reckoning the work done in displacing the air. At this point the wave would be reduced to 1 in. in height.

In an interesting series of experiments for ascertaining the waves or impulses propagated through water in a closed vessel, so arranged as not to allow actual movement of translation in the fluid, by means of a chronograph specially constructed, capable of measuring continuous operations, lasting 1-500th of a second, Mr. Tylor found, as the mean of two experiments, that an impulse of 10 lbs. was propagated at a speed of 397 miles per minute, through a 1-in. composition pipe, 97 ft. long, and completely filled with water. Comparing this result with the partly analogous case of an earthquake shock conveyed by the sea, Mr. Tylor refers to Dr. Frederick von Hochstetter's report on the earthquake at Arica, near Lima, in August, 1868, from which it appears the shock was recorded on the tide gauge at Newcastle, near Sydney, in Australia, as vibrations in the water, and not as an actual wave. The distance traversed being 7380 miles, and the time required by the shock to traverse this distance being 22 hours 28 minutes, gives a velocity of five miles per minute. In the earthquake of May 9, 1877, at Huamitos, on the coast of Peru, ships trembled through vibrations in the water, while similar vibrations are reported by Mr. W. H. Russell to have been recorded on the Newcastle tide gauge (Sydney) on the 11th of the said month, in answer to Mr. Tylor's enquiry whether the pencil of the tide gauge had not been in a tremble at that particular day. Observations show that the shock caused by the Lisbon earthquake in 1775 travelled six miles a minute to the West Indies.

The action of the tide on any coast is, in Mr. Tylor's opinion, rather the consequence of a series of impulses or vibrations than the result of material waves. He instances that a ship at ebb tide near London is 10 ft. below the level of the ocean, while at flood tide the same ship would be 10 ft. above the level of the sea. The level of the ocean in the meantime has not changed, although its whole mass has an alternate and opposite horizontal vibration twice in 24 hours. The impulse starting the tide on the Atlantic coasts must travel at the rate of at least 6 miles per minute; for it is seen that the greatest range of the times of the turn of the tide in the Irish sea (186 miles long) is only a few minutes. This has been ascertained by Capt. Beechey some 30 years since by anchoring boats at short distances around the whole coast, and observing that the tide turned simultaneously at all points. This turn of the tide, which is independent of high and low water, can only be caused by positive and negative impulses or vibrations from the Atlantic itself. Hence Mr. Tylor concludes that the term "tide" is a better one than "tidal wave," as no wave in the true sense of the word exists which could satisfy the theory held by many scientific men that a tidal wave travels round the earth at a speed of 1000 miles per hour, always in the same direction. On the contrary, the semi-diurnal movement of the tidal water is nearly equal and opposite. Mr. Tylor considers that the causes of the diurnal variation of the tide is due to the change of position relatively to the moon which each place goes through in 12 hours. That is, a place on the equator, 200,000 miles distant from the moon, may be 208,000 miles distant 12 hours afterwards; the earth having, during this time, made a semi-revolution, the place will be 8000 miles in a direct line further from the moon, and he states "that the cause of diurnal variation is due to the changes both of the angular incidence of the moon's attraction and the changes of the moon's absolute force of attraction, due to differences of distance at which that attraction acts, as well as the direction in which it acts, and the declination of the moon alone cannot be the sole direct or even principal cause of diurnal variation of the tide, though it has a very appreciable effect thereon."

MAY AND MOUNTAIN, BIRMINGHAM,

ENGINEERS, MILLWRIGHTS, IRONFOUNDERS, COPPERSMITHS AND BOILER MAKERS,

SOLE MANUFACTURERS OF

TORKINGTON & HEYS' PATENT LUBRICATOR, FOR OIL, TALLOW, OR OTHER LUBRICANT.

Entirely Self-acting.

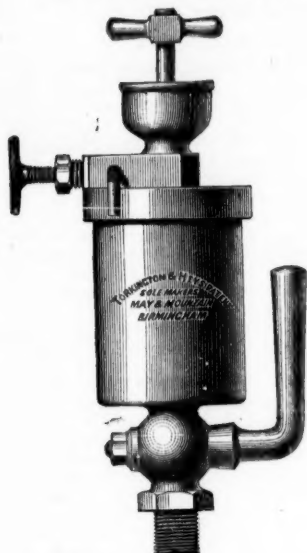
The Flow of Grease, being regulated by the Steam, is constant, varying

with the amount of Steam used.

No Waste.

Perfect Lubrication.

Greatest possible Economy.



No.	Size. Inches.	Horse-power.	Price.
00	1 1/4	Agricultural	8s. 6d.
0	1 1/2	Engines...	10 6
1	2	5 to 7	14 6
2	2 1/2	7 10	17 6
3	3	10 20	27 6
4	3 1/2	20 30	37 6
5	4 1/2	30 50	47 6
6	5	50 70	60 0
7	6	70 100	90 0
8	7	100 200	105 0

COLEBROOK'S Patent STEAM PUMP.

THE MOST RELIABLE AND ECONOMICAL
DIRECT-ACTING PUMPS.

Short Pistons and Long Strokes.

The Slide Valve is worked by the Exhaust Steam alone.

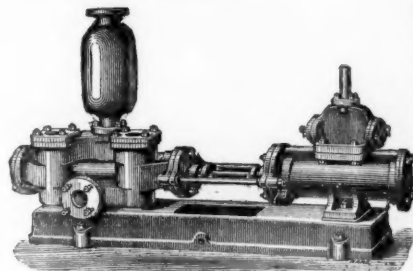
No Tappets, Valves, Levers, or other Mechanical Appliances.

All parts Simple and Easy of

access.

Adapted for all purposes and to

all circumstances.



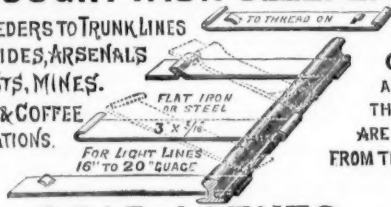
PRICES OF A FEW LEADING SIZES.

Steam cylinder ...In.	3	4	4	6	6	7	8	8	10
Water ditto ...In.	1 1/2	2	4	4	6	6	6	8	8
Stroke	12	18	18	18	18	18	18	18	8
Gallons per hour.....	720	1260	5040	4280	9660	8700	7920	12,180	12,000
Price	16	19	25	33	41	45	50	65	80

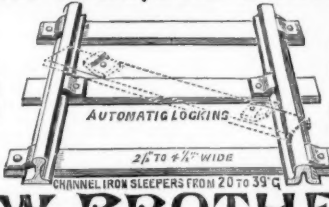
LARGER AND SMALLER SIZES IN ALL COMBINATIONS OF STEAM AND WATER CYLINDERS.
DESCRIPTIVE PRICES ON APPLICATION.

A NARROW GAUGE RAILWAY **LEGRAND'S PATENT** COMPLETE IN TWO PARTS, FROM £250 PER MILE WROUGHT IRON SLEEPERS TO FIT ANY RAIL, DISPENSING WITH SPIKES & ALL LOOSE PIECES.

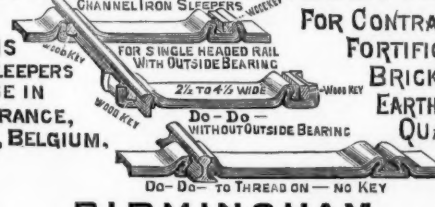
FOR FEEDERS TO TRUNK LINES
QUAYSIDES, ARSENALS
FORESTS, MINES.
SUGAR & COFFEE
PLANTATIONS.



THE OUTSIDE
CLIPPING SLEEPERS
ARE LAID FIRST, THEN
THE INSIDE SLEEPERS
ARE HAMMERED UP AS
FROM THE DOTTED LINES.



7 MILLIONS
OF THESE SLEEPERS
ARE IN USE IN
ENGLAND, FRANCE,
GERMANY, BELGIUM.



FOR CONTRACTORS.
FORTIFICATIONS
BRICKYARDS,
EARTHWORKS,
QUARRIES

SOLE AGENTS, **SHAW BROTHERS, BIRMINGHAM**
DRAWINGS & PARTICULARS ON APPLICATION. TO SAVE TIME PLEASE GIVE GAUGE, WEIGHT OF RAIL AND KIND OF TRAFFIC.

IRON, BRASS, & COPPER WIRE CLOTH

ALL KINDS.

STRONG HAND-MADE WIRE COVERS,

For Revolving Screens, as used for Copper Pyrites, and other purposes;

Also, RIDDLES, SIEVES, and GENERAL WIRE-WORK,
At the most moderate rates.

WILLIAM RIDDELL AND CO.,
24, WEST HOWARD STREET,
GLASGOW.

PATENT DUPLEX LAMPS,

FOR COLLIERIES, IRONWORKS, &c.

SUITABLE FOR PIT BANKS, ENGINE HOUSES, &c., &c.



Each Lamp gives a light equal to
25 candles.
No breakage of Chimneys from
heat.
Cottons last three months.
Will burn any mineral oil.

S. HOOPER,
LAMP MAKER & OIL MERCHANT,
LOWER TEMPLE STREET,
BIRMINGHAM.

N.B.—Lamps made suitable for every
purpose.

The BEST SIGNAL BELL MADE for
MINING PURPOSES.

ILLUSTRATIONS ON APPLICATION.

**MR. W. F. STANLEY, MATHEMATICAL INSTRUMENT
MANUFACTURER TO H.M.'S GOVERNMENT, COUNCIL OF INDIA
SCIENCE AND ART DEPARTMENT, ADMIRALTY, &c.
MATHEMATICAL, DRAWING, and SURVEYING INSTRUMENTS of every
description, of the highest quality and finish, at the most moderate prices.
Price-list post free.**

ENGINE DIVISION TO THE TRADE.
ADDRESS—GREAT TURNSTILE, HOLBORN, LONDON, W.C

BRYDON AND DAVIDSON'S ROCK DRILL,

SELECTED BY THE BRITISH AND OTHER GOVERNMENTS.

Reduced prices of this Rock Drill, Nos. 1 and 2, £32 and £34.

SUBJECT TO DISCOUNT.

IMPROVED AIR COMPRESSORS.

Makers of Pumping and Winding Engines, Steam Hammers,
Boilers, Pump Pipes, &c., &c. Castings of all kinds.

**BRYDON AND DAVIDSON, ENGINEERS,
WHITEHAVEN.**

WANTED, AN INFLUENTIAL AGENT IN LONDON, TO SELL THE ABOVE SPECIALITIES, AND GENERAL
MACHINERY.

JOHN MARSDEN,

MANUFACTURER OF

Air Tubing and Improved Brattice Cloth,

Tared, Oiled, and Non-Inflammable.

THE OILED CLOTH IS ESPECIALLY RECOMMENDED FOR DAMP MINES, AND IS
ALSO A GOOD COVERING FOR SHEDS.
THE NON-INFLAMMABLE FOR THE MORE DANGEROUS MINES.

Samples and prices free, on application at the Works,

**VARLEY STREET, OLDHAM ROAD,
MANCHESTER.**



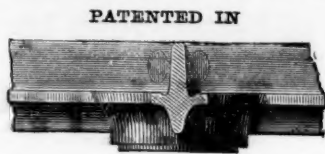
HARRIS'S PATENT WROUGHT-IRON WINDOWS.

DOME AND OTHER ROOF LIGHTS, FLOOR AND PAVEMENT LIGHTS, ETC.



GREAT BRITAIN,
UNITED STATES OF AMERICA,

ARE STRONGER, SUPERIOR, AND CHEAPER
THAN ANY OTHER METAL SASHES YET
PRODUCED—COST LESS FOR GLAZING—
ARE AS CHEAP IN MANY CASES AS WOOD



PATENTED IN

FRANCE,
GERMANY, AND BELGIUM.

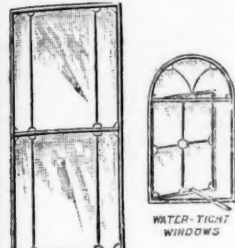
—CAN BE DESIGNED AND MANUFACTURED
TO SUIT ANY STYLE OF ARCHITECTURE
OR POSITION WHERE A WINDOW MAY BE
REQUIRED.

ARE BEING EXTENSIVELY USED IN—



Private Houses,
Parsonage Houses,
Farm Houses,
Churches,
Chapels,
Schools,

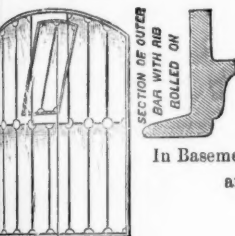
Lunatic Asylums, &c.,
Public Buildings, Banks,
Wharves, Warehouses,
Factories, Mills,
Breweries, &c.,
Engine Houses.



PAIR OF SASHES
TO RUN WITH WEIGHTS



WATER-TIGHT
WINDOWS



BASEMENT SASH
NO GUARD BARS OR
SHUTTER REQUIRED

ILLUSTRATED CATALOGUES
ON APPLICATION.

In Basement Storeys and Exposed Positions Shutters
and Guard Bars are dispensed with.

HOME AND

SOLE MAKER—J. T. HARRIS, Engineer, Ironfounder, and Manufacturer,

SAFE, STRONG ROOM, AND PARTY WALL DOORS, AND EVERY KIND OF CONSTRUCTIONAL AND BUILDERS' IRONWORK, LIFTS, HOISTS, ELECTRIC BELLS AND TELEGRAPHS, &c.
90, CANNON STREET, LONDON, E.C.; AND BEAUFORT IRONWORKS, BRISTOL.



BOLTS, NUTS, AND COACH SCREWS.

ARCHER AND HARPER,

PROVIDENCE BOLT AND NUT WORKS, THE GREEN, DARLASTON,

Manufacturers of all kinds of Shipbuilders', Engineers', Coach, Wagon, and Fish Bolts; Coach Screws; Railway Spikes and Brobs; Hot-pressed and Forged Nuts, Rivets, Washers, &c., &c.

SHIPBUILDERS' AND RAILWAY STORES' CONTRACTORS.



IMPORTANT.

JOSEPH WRIGHT AND CO.

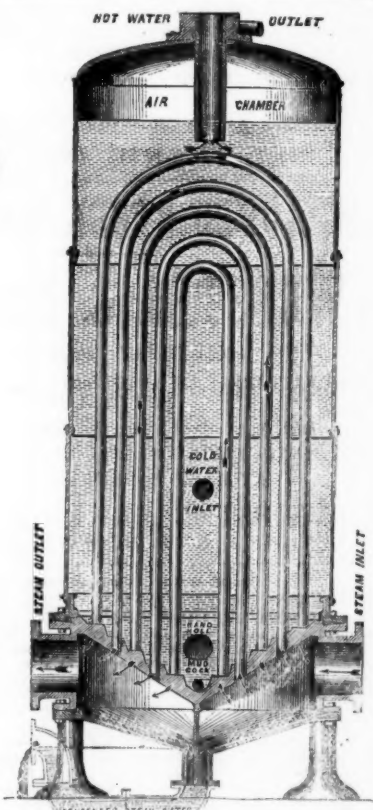
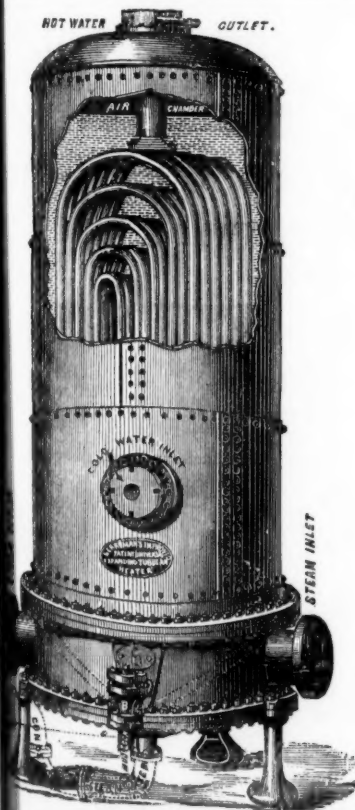
(LIMITED),

NEPTUNE FORGE ENGINE
AND BOILER WORKS,

TIPTON,

STAFFORDSHIRE,

AND AT 147, QUEEN VICTORIA STREET, LONDON, E.C.



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 23, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.
Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.
ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.
Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the water works pressure is sufficient no pump or injector is needed.
The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided. Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are used at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.
The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using FOUR HUNDRED AND THIRTY-THREE of these Heaters.

At the PARIS EXHIBITION the Jurors have Awarded

THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION
FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

Improved Patent Stone Breakers & Ore Crushers

New Patent Reversible Jaws,
in Sections, with Patent
Faced Backs.

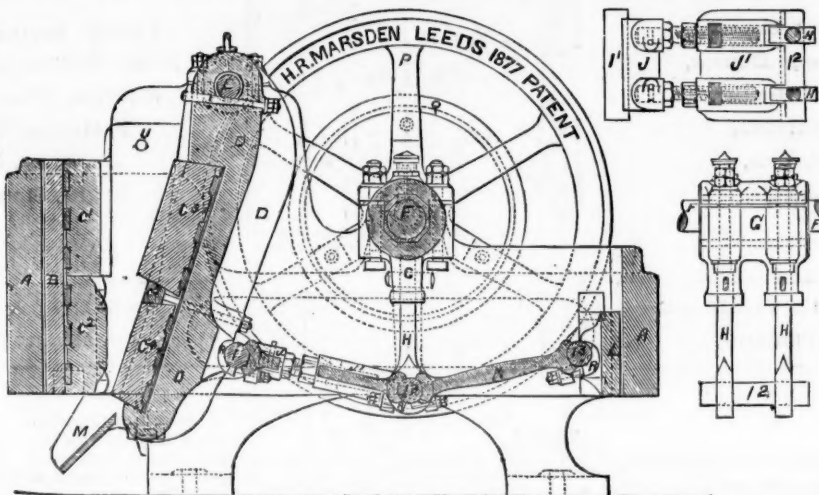
NEW PATENT ADJUSTABLE
TOGGLES.
OVER 2500 IN USE.

New Patent Draw-back
Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharhole Lime Works, Maryport, White
November 7, 1878.
H. E. MARSDEN, Esq., Soho Foundry, Meadow Lane,
DEAR SIR,—The machine I have in use is one of the
size, 24 in. by 12 in. The quantity we are breaking daily
this one machine is 250 tons, the jaw being set to break
size of 2½ in. We have, however, frequently broken
300 tons per day of ten hours, and on several occasions
350 tons during the same period. The stone we break
blue mountain limestone, and is used as a flux in the
ironworks in this district. We have now had this machine
daily use for over two years without repairs of any kind
have never had occasion to complain of any inconvenience
using the machine. I hope the one you are now making
me may do its work equally well. The cost—INCLUDING
GINE-POWER, COALS, ENGINEMAN, FEEDING, and all other
OF EVERY KIND—is just 3d. per ton. Should any
friends feel desirous of seeing one of your machines
I shall have much pleasure in showing the one alluded
I am, dear Sir, yours very truly,
WILLIAM MILNE

AND THIS—

Wharhole Lime Works, Aspatria, Cumbria
July 11th, 1878.
H. R. MARSDEN, Esq., Soho Foundry, Leeds.
DEAR SIR,—We are in receipt of your letter of 4th
may just state that the stone breaker above named
under my personal superintendence since its erection
have no hesitation in saying that it is as good now as
five years ago.
I am, dear Sir, yours faithfully,
FRANCIS GOSWOLD

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

The Barrow Rock Drill
COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY
ONES that have been SUCCESSFULLY WORKED in the
MINES of CORNWALL. At DOLCOATH MINE, in the
HARDEST known ROCK, a SINGLE MACHINE has, since
its introduction in July, 1876, driven MORE THAN THREE
TIMES the SPEED of HAND LABOUR, and at TWENTY PER
CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together,
and at a proportionately increased speed. They are strong,
light, and simple, easily worked, and adapted for ends and
stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS,
and all necessary appliances for working the said Drills.

Apply to—

LOAM AND SON,
LISKEARD, CORNWALL.

IMPROVED STEEL WIRE FOR ROPES.

WEBSTER & HORSFALL,
(ORIGINAL PATENTEES),

MANUFACTURERS OF IMPROVED STEEL WIRE FOR ROPES
FOR COLLIERIES,

RAILWAY INCLINES, PLOUGHS, HAWSERS, &c.

SOLE MANUFACTURERS of the HOMOGENEOUS WIRE for the
ATLANTIC CABLES of 1865 and 1866.

WEBSTER AND HORSFALL,
BIRMINGHAM.

Second Edition. Just published, price 8s. 6d.

A NEW GUIDE TO THE IRON TRADE
OR, MILL MANAGERS' AND STOCK-TAKERS' ASSISTANT;
Comprising a Series of New and Comprehensive Tables, practically arranged to
show at one view the Weight of Iron required to produce Boiler-plates, Sheet-iron,
and Flat, Square, and Round Bars, as well as Hoop or Strip Iron of any dimen-
sions. To which is added a variety of Tables for the convenience of Merchants,
including a Russian Table. BY JAMES ROSE.
Batman's Hill Ironworks, Bradley, near Bilston.

OPINIONS OF THE PRESS.

"The Tables are plainly laid down, and the information desired can be instantly
neciously obtained."—*Mining Journal*.

"900 copies have been ordered in Wigan alone, and this is but a tithe of those to
whom the book should commend itself."—*Wigan Examiner*.

"The work is replete on the subject of underground management."—*M. BAKER*
Colliery Proprietor.

To be had on application at the MINING JOURNAL Office, 28, Fleet-street, London

THE GREAT ADVERTISING MEDIUM FOR WALES.

THE SOUTH WALES EVENING TELEGRAM
(DAILY), and

SOUTH WALES GAZETTE
(WEEKLY), established 1857.

the largest and most widely circulated papers in Monmouthshire and South Wales
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the
second edition at Five P.M. On Friday, the "Telegram" is combined with the
South Wales Weekly Gazette, and advertisements ordered for not less than six
consecutive insertions will be inserted at a uniform charge in both papers.
P. O. O. and cheques payable to Henry Russell Evans, 14, Commercial-street
Newport, Monmouthshire.

THE IRON AND COAL TRADES' REVIEW.

The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the
Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron
and coal districts. It is, therefore, one of the leading organs for advertising every
description of Iron Manufactures, Machinery, New Inventions, and all matters
relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general.
Offices of the Review: 7, Westminster Chambers, S.W.
Remittances payable to W. T. Pringle.

THE "CHAMPION" ROCK BORE

MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TEST
IRON PIPES, &c.



Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and
ELECTRIC BLASTING APPARATUS.

Full particulars of rapid and economical work effected
by this machinery, on application.

CONTRACTS TAKEN, OR SPECIAL TERMS FOR HIRE

ULLATHORNE AND CO., Mechanical and Consulting Engineers,
23, QUEEN VICTORIA STREET, LONDON

British and Foreign Safety Fuse Company

REDRUTH, CORNWALL,

MANUFACTURERS OF

SAFETY FUSE

FOR MINING AND QUARRYING PURPOSES

PRICES ON APPLICATION

PARIS EXHIBITION, 1878.

HONOURABLE MENTION

Has been awarded to

SALMON, BARNES, AND CO.,

FOR THEIR

PATENT ROANHEAD ROCK DRILL

AND THE HIGHEST AWARD,

A **SILVER MEDAL,**

FOR

IRON AND WOOD REVOLVING SHUTTERS,

Worked by their PATENT BALANCE-WEIGHT MOTION.

Canal Head Foundry and Engineering Works, Ulverston

LANCASHIRE.

J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),

Manufacturers of

CRANE, INCLINE, AND PIT CHAINS

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES,
FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS,

RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Orab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions

STOURBRIDGE FIRE BRICKS AND CLAY.